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ABSTRACT

This study presents results from the last year of a three-year adjunctive evaluation of classroom process measurement and pupil growth. A total of 289 classrooms involving eight experimental programs, ranging from open classrooms to contingency management classes, along with a comparison sample, were observed. Four observation instruments were used; two were coded during the classroom observation, and two were coded from audio tape. Factor scores were calculated for each set of observation data and used to test discrimination between programs. The scores were also related to classroom mean pupil regressed gain which had been scored to identify different levels of complexity. Observation was successful in discriminating between programs, with 33 of 39 factors significant. Results indicated that classroom measures and pupil gain showed more significant relationship with skill than with abstract or concrete growth. Although there were inconsistencies, gain in skill was related to greater amounts of (a) focus, (b) drill, (c) convergence, (d) structured activity with the teacher and time spent on reading, and (e) lesser amounts of pupil freedom. (Appendixes depicting measurement instruments and observation records are included, along with a list of references.) (Author/JS)

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FINAL REPORT
FOLLOW THROUGH CLASSROOM PROCESS MEASUREMENT AND PUPIL GROWTH (1970-71)*

By

Robert S. Soar

FOUNDATIONS DEPARTMENT

INSTITUTE FOR DEVELOPMENT OF HUMAN RESOURCES

COLLEGE OF EDUCATION
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Ruth Soar has been codirector in every way but in name, in planning the project as a whole, collaborating in application and report writing, wrestling with budgets, developing instruments, collecting data, planning and programming data analyses, and interpreting the results. Marjorie Ragosta has been central in the work of the project since its beginning; she began as an observer, then coder and observer trainer and supervisor, data processor, field supervisor, and finally project manager. She has collaborated in development of instruments, organized and coordinated the work of field staff and coders, coordinated the project with school systems, and has been central in the analysis of the data. Mary Webb has been observer and provided valuable "back up" as trainer, supervisor and "house mother" to the staff of student coders who worked diligently to decipher tapes which were sometimes difficult.

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The data processing was done by Marjorie Ragosta, Earl Blekking, and Ruth Soar. Denise Stevens has dealt with travel and other details, and Janice Larson has coordinated the myriad administrative and clerical details that accompanied the project, as well as working competently and cheerfully in turning rough draft into a final report.

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To all, a heartfelt thanks!

Robert S. Soar, Professor
and Project Director

June 1973

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Introduction

As part of the evaluation of project Follow Through, the Institute for the Development of Human Resources of the University of Florida (IDHR) assumed responsibility for collecting observational data in a sample of classrooms representing a number of experimental programs. Three waves of data have been collected: 70 classrooms each in the winters of 1969 and 1970; and 289 in the winter of 1971. The results for the first two years were reported earlier (Soar, 1971); the results of the third year are reported here.

Two sets of goals lay behind this effort:

1. To describe in behavioral terms the differences among the programs as observed in the classrooms, and
2. To relate these behavioral dimensions to pupil growth.

The observational measures were not focused directly on the identification of sponsor objectives and the development of items to represent them. Rather, they were selected from already existing instruments and represented a broad conception of classroom interaction as it has been developed over the past years. The instruments ranged from one with very extensive research background to two with some previous use, to one which was newly developed from work of others.

To enable study of relations between measures of classroom observation and pupil growth, Stanford Research Institute (SRI), the principal outside evaluator of Follow Through, provided test data on pupils.

Procedure

Sample

The first two years, seven programs were selected in which at least eight classrooms could be observed which seemed to represent the diversity of programs present in Follow Through (although the latter criterion was a subjective and uncertain one). Two comparison classrooms were selected from the same settings in which the programs were located, in the hope of equating, in a rough way, system-related variance for program and comparison classrooms. Insofar as possible, settings and programs were selected for observation where SRI was collecting complete data from pupils. Each of the first two years a total of 70 classrooms was observed: eight program and two comparison classrooms from each of seven programs. The third year, a total of 289 classrooms were observed from eight experimental programs, as well as a sample of comparison classrooms. The constraint of observing in settings where SRI had collected pretest data was more severe as the sample was expanded, and equality of numbers of classrooms by sponsor and by grade level could not be maintained. Four grade level groups were included, kindergarten, entering first grade (without previous kindergarten); nonentering (or continuing) first grade, and second grade. The sample, by sponsor, community, and grade level is shown in Tables 1 through 5.

Table 1

Kindergarten Classrooms Observed by Program and Community*

Community	Bank Street	Becker Engel-mann	Bushell	Educ. Devel. Center	Gotkin	Nim-nicht	Parent Educ.	Tucson
California								
Berkeley						4+1		
Florida								
Jacksonville							3+1	
Georgia								
Atlanta					8+1			
Indiana								
Vincennes								1+1
Kansas								
Wichita								4+1
Kentucky								
Louisville			2+2					
Michigan								
Flint		3+1						
Grand Rapids		3+1						
Minnesota								
Duluth						3+1		
New Hampshire								
Lebanon						3+1		
New Jersey								
Lakewood								3+0
New York								
Rochester	4+1							
New York			2+0					
Pennsylvania								
Philadelphia	3+1		3+0	4+0			4+1	
Vermont								
Brattleboro	2+0							
Burlington				3+1				
Washington, D.C.				1+0				
Washington								
Tacoma						1+0		
Wisconsin								
Racine		2+0						
Virginia								
Richmond							1+0	
Program Total	9+2	8+2	7+2	8+1	8+1	11+3	8+2	8+2

*The second entry represents number of comparison classrooms.

Table 2

Entering First Classrooms Observed by Program and Community*

Community	Bank Street	Becker Engel-mann	Bushell	Educ. Devel. Center	Gotkin	Nim-nicht	Parent Educ.	Tucson
Alabama								
Tuskeegee	8+2							
Arkansas								
Jonesboro							3+1	
Delaware								
Laurel				5+1				
Florida								
Tampa							2+0	
Georgia								
Lafayette								1+1
Linwood								0+1
Rising Fawn								1+0
Rossville								1+0
Walker City								1+0
Illinois								
Mound City			1+0					
Mounds			4+0					
Ullin			0+1					
Mississippi								
Tupelo		3+1						
North Carolina								
Clayton				1+0				
Four Oaks				1+0				
Goldsboro						8+2		
Selma				2+1				
Smithfield				1+0				
Tennessee								
Chattanooga							5+1	
Texas								
Uvalde		6+1						
Program Total	8+2	9+2	5+1	10+2	0	8+2	10+2	4+2

*The second entry represents number of comparison classrooms.

Table 3

Continuing First Classrooms Observed by Program and Community*

Community	Bank Street	Becker Engel-mann	Bushell	Educ. Devel. Center	Gotkin	Nim-nicht	Parent Educ.	Tucson
California								
Berkeley						5+1		
Florida								
Jacksonville							2+2	
Georgia								
Atlanta					6+2			
Indiana								
Vincennes								2+0
Kentucky								
Louisville			4+1					
Massachusetts								
Fall River	4+0							
Minnesota								
Duluth						2+1		
New York								
New York City			2+0		2+0			
Pennsylvania								
Philadelphia	4+1		4+1	6+2			4+1	
South Carolina								
Greeleyville		2+0						
Kingstree		0+1						
Lane		2+0						
Salters		2+0						
Texas								
Ft. Worth								7+2
Vermont								
Brattleboro	2+1							
Virginia								
Richmond							3+0	
Washington								
Tacoma						4+1		
Wisconsin								
Racine		4+1						
Program Total	10+2	10+2	10+2	6+2	8+2	11+3	9+3	9+2

*The second entry represents number of comparison classrooms.

Table 4

Second Grade Classrooms Observed by Program and Community*

Community	Bank Street	Becker Engel-mann	Bushell	Educ. Devel. Center	Gotkin	Nim-nicht	Parent Educ.	Tucson
California								
Berkeley						7+1		
Massachusetts								
Fall River	6+1							
Pennsylvania								
Philadelphia	1+1			2+0			1+0	
Texas								
Ft. Worth								8+2
Lott				0+1				
Rosebud				2+0				
Virginia								
Richmond							5+2	
Wisconsin								
Racine		4+1						
Program Total	7+2	4+1	0	4+1	0	7+1	6+2	8+2

*The second entry represents number of comparison classrooms.

Table 5

Classrooms Observed by Sponsor and Grade Level*

Sponsor	K	E-1	C-1	2	Subtotals	Total
Bank Street	9-2	8-2	10-2	7-2	34-8	42
Becker-Engelmann	8-2	9-2	10-2	4-1	31-7	38
Bushell	7-2	5-1	10-2	---	22-5	27
Ed. Devel. Center	8-1	10-2	6-2	4-1	28-6	34
Gotkin	12-1	---	8-2	---	20-3	23
Nimnicht	11-3	8-2	11-3	7-1	37-9	46
Parent Educ.	8-2	10-2	9-3	6-2	33-9	42
Tucson	8-2	4-2	9-2	8-2	29-8	37
Subtotal	71-15	54-13	73-18	36-9	234-55	289
Total	86	67	91	45	289	289

*The second entry represents number of comparison classrooms.

The sample was drawn nationally -- from Tampa, Florida, to Spokane, Washington; from Berkeley, California, to Burlington, Vermont. Generally, each sponsor was represented by at least two communities at each grade level, with comparison classrooms drawn from the same schools as program classrooms or from nearby schools at similar socio-economic levels. At kindergarten and non-entering first grades, both small town and urban settings are represented as well as a spread of geographic regions. The entering first grade sample was primarily rural and southern, however, since it is defined by the absence of preceding kindergarten. Seven classrooms, sampled on the basis of information identifying them as entering first grade, were later found to have taken the continuing first grade test battery. Their observation data was processed as entering first but in relations of gain to behavior they were, of course, processed as non-entering first grade. The second grade sample was small, and not well distributed across sponsors. The only other deviation which appears notable is the primarily small town nature of the nonentering first grade Becker-Engelmann sample. A summary, by grade level and sponsor, appears in Table 5.

Classroom Observation Measures

Florida Climate and Control System (FLACCS) was a modification of the South Carolina Observation Record (Soar, 1966), which drew heavily on the Hostility-Affection Schedule (Fowler, 1962), and the earlier versions of the Observation Schedule and Record (Medley and Mitzel, 1958, private communication). The rationale of the instrument, overall, was the development of a schedule which would emphasize behavior which Interaction Analysis did not record. Among these were the nonverbal expression of affect in the classroom, physical movement of teacher and pupils, the groupings found in the classroom, and the extent to which individuals or groups were central in classroom activities.

Additional items were drawn from Katz, Peters, and Stein (1968), and Sears, Rau, and Alpert (1964) to represent behavior of younger children, and a number of new items were developed.

On the basis of the first year's experience, the instrument was revised extensively for the second year's data collection. The first section was organized around the concept of direction and control of the classroom by the teacher (or other adults) and the response of pupils. As part of the reorganization, items representing teacher control were increased, especially items representing subtle verbal and non-verbal control procedures. Twenty items of verbal teacher control were scaled into five levels of coerciveness ranging from "Guides, Suggests", to "Orders, Commands." A smaller number of non-verbal items were similarly scaled. The pupil items represented response to teacher control such as assumption of responsibility for classroom order, pupil task involvement, obeying, resisting or disobeying, and the organization of the classroom. The second section, affect expression, was only slightly revised. This version with only minor modification, was used for the 1970-71 data collection. Overall, the number of items was increased, and the question of dividing the instrument in two was considered. This alternative was rejected, however, since much of the affect expressed by adults is used in classroom management, and some portion of pupil affect is interactive with

adult control. The instrument was made up of three five-minute observation periods, each followed by five minutes of marking (a procedure which paralleled the other instrument used for live observation). Four instruments were completed during a day in the classroom.

Figure 1 - Florida Climate and Control System

INSTITUTE FOR THE DEVELOPMENT OF HUMAN RESOURCES
University of Florida
Gainesville, Florida
November 25, 1970

FLACCS*

Florida Climate and Control System
(1970-1971)

Program _____ Teacher _____

City _____ Date _____

School _____ Observer _____

Grade _____ Series _____

Children's Art Work Displayed

Abundant & varied	Quite a few	Some	A few	None
5	4	3	2	1

Relation of Room Displays and Artifacts
To Children's Subcultural Background

Most are clearly related	Quite a few are related	Some are related	A few are related	None are related	Not applicable
5	4	3	2	1	0

*This is an experimental form which should not be cited or used without permission of the developers.

Figure 1 - Continued

C.	Tot	1	2	3	TEACHER
10					Teacher Central
11					Leads singing, games, storytm
12					Moves freely among pupils
13					Withdraws from class
14					Uses blackboard, A-V Equip.
15					Ignores, refuses to attend P.
16					Attends P. briefly
17					Attends P. closely
18					Attends P. in succession
19					Attends simultaneous activ.
					VERBAL CONTROL
20					Praises
21					Asks for status
22					Suggests, guides
23					Feedback, cites reason
24					Questions for reflitive. thot
25					Correct w/o criticism (SM)
26					Questions for control
27					Questions states beh. rule
28					Directs with reason
29					Directs w/o reason
30					Uses time pressure
31					Call child by name (EWS)
32					Interrupts Pupil, cuts off
33					Warns
34					Supv. p. closely, imblizes.
35					Criticizes
36					Orders, commands
37					Scolds, punishes
38					Uses firm tone
39					Uses sharp tone
					NONVERBAL CONTROL
40					Tolerates deviant beh.
41					Positive redirection
42					Nods, smiles for control
43					Positive facial feedback
44					Uses "body English"
45					Gestures
46					Gives tangible reward
47					Touches, pats (gentle)
48					Holds, pushes, spanks (harsh)
49					Takes equipment, book
50					Signals, raps
51					Shhh! Shakes head
52					Glares, frowns

C.	Tot	1	2	3	PUPIL
10					Pupil Central
11					Pupil -- no choice
12					Pupil -- limited choice
13					Pupil -- free choice
14					(*Seat work w/o teacher
15					(*Seat work with teacher
16					(*Works, plays w. much supv.
17					(*Works, plays w. little supv.
18					(*Resists, disobeys directions
19					(*Obeys directions
20					Asks permission
21					Follows routine w/o reminder
22					Reports rule to another
23					Tattles
24					Gives information
25					Gives direction
26					Gives reason
27					Speaks aloud w/o permission
28					Engages in out-of-bounds beh.
29					Collaborates w. teacher
30					Task related movement
31					Aimless wandering
32					Fantasy
33					Uses play object as itself
34					Parallel play or work
35					Works, plays collaboratively
36					Works, plays competitively
37					Seeks reassurance, support
38					Shows pride
39					Shows fear, shame, humiliation
40					Shows apathy
					WORK GROUPS
41					Pupil as individual
42					Group w. teacher
43					Structured groups w/o t.
44					Free groups
					SOCIALIZATION
45					Almost never
46					Occasionally
47					Frequently
					MATERIALS
48					Structure T. behavior
49					Structure P. behavior
					PUPIL INTEREST ATTENTION
50-51					(Rank 1 low to 5 high)

Figure 1 - Continued

NEGATIVE AFFECT

Teacher

C.	Tot	1	2	3	Verbal	C.	Tot	1	2	3	Nonverbal
10					Says "stop it," etc.	10					Waits for child
11					Uses threatening tone	11					Frowns
12					Rejects child	12					Points, shakes finger
13					Criticizes, blames	13					Pushes or pulls, holds
14					Warns	14					Shows disgust
15					Yells	15					Takes material
16					Scolds, humiliates	16					Refuses to respond to child
17					Other	17					Other
18					Code Involvement						

Pupil

					Verbal						Nonverbal
19					Says "No," "I won't" etc.	18					Makes face, frowns
20					Teases	19					Pouts, withdraws
21					Laughs	20					Uncooperative, resistant
22					Tattles	21					Stamps, throws, slams
23					Commands or demands	22					Interferes, threatens
24					Makes disparaging	23					Takes, damages property
25					Demands attention	24					Picks at child
26					Makes someone "feel small"	25					Pushes or pulls, holds
27					Finds fault	26					Hits, hurts
28					Threatens	27					Is left out
29					Other	28					Other
30					Code Involvement						

POSITIVE AFFECT

Teacher

					Verbal						Nonverbal
31					Says "Thank you," etc.	29					Accepts favors for self
32					Agrees with child	30					Waits for child
33					Supports child	31					Gives individual attention
34					Gives individual attention	32					Warm, congenial
35					Warm, congenial	33					Listens carefully to child
36					Praises child	34					Smiles, laughs, nods
37					Develops "we feeling"	35					Pats, hugs, etc.
38					Is enthusiastic	36					Sympathetic
39					Other	37					Other
40					Code Involvement						

Pupil

					Verbal						Nonverbal
41					Says "Thank you," etc.	38					Helpful, shares
42					Sounds friendly	39					Leans close to another
43					Agrees with another	40					Chooses another
44					Initiates contact	41					Smiles, laughs with another
45					Offers to share, cooperate	42					Pats, hugs another
46					Supports another	43					Agreeable, cooperative
47					Is enthusiastic	44					Enthusiastic
48					Praises another	45					Horseplay
49					Helps another	46					Other
50					Other	47					(Continued over)
51					Code Involvement						

CODE INVOLVEMENT

0. None involved
1. Few involved
2. Up to ½ the class
3. More than half

The first year's data indicated that the earlier version of FLACCS both discriminated significantly between programs, and related to pupil growth. Program discrimination was demonstrated in the second year data, but pupil data were too limited to permit drawing very firm conclusions (Soar, 1971).

Teacher Practices Observation Record (TPOR) - The Teacher Practices Observation Record is an instrument developed to measure a teacher's practices in relation to John Dewey's Experimentalism (Brown, 1968). It consists of 62 sign items of teacher behavior (see Figure 2). There are no pedagogically "bad" items on the TPOR; every item describes a teacher behavior that is widely practiced in schools. However, half the items (the even numbers) describe behavior which reflects agreement with Experimentalism and would be espoused by John Dewey; the other half (the odd numbers) reflect disagreement. In the original procedure, the observer's task was to check those items which occurred during three ten-minute observation periods. The time periods used in this project have been reduced to five minutes in order to parallel FLACCS.

Brown has done extensive research with the instrument, relating it to measures of beliefs, and has shown relations between a teacher's beliefs and teaching practices, and between an observer's beliefs and what he sees in the classroom.

The TPOR provides information which relates to the instructional or pedagogical practices employed in the classroom. The major classifications of items for recording behavior are (a) Nature of the Situation, (b) Nature of the Problem, (c) Development of Ideas, (d) Use of Subject Matter, (e) Evaluation of Pupil's Work, (f) Differentiation of Tasks, and (g) Motivation and Control. Data are produced describing whether the teacher or pupil is the center of attention, the extent to which pupils are active or passive, and the amount of freedom which is permitted pupils. The nature of the problem is organized around the concerns of pupils or the concerns of the teacher or textbook, as well as the difficulty of study topics. Information is recorded as to whether ideas are treated in a "hypothetical" or "expository" manner, and whether they are dealt with in a creative or routine fashion. Subject matter is classified as to whether the pupils or the teacher assumes primary responsibility for locating it, whether it is taken from a textbook or a wide range of sources, whether it is accurate or inaccurate. Whether the teacher evaluates the pupils' work or the pupils engage in self-evaluation is recorded. The degree to which the classroom tasks are differentiated for individual pupils is measured, along with the extrinsic-intrinsic nature of the motivation and the type of the disciplinary control.

Data from the first year indicated significant differentiation between programs, and relations with pupil growth. Programs were differentiated the second year, but pupil data were too limited to permit drawing very firm conclusions (Soar, 1971).

Florida Taxonomy of Cognitive Behavior - The original instrument was developed by the Florida group under Brown's leadership. Its history originates with The Taxonomy of Educational Objectives: The Cognitive Domain (Bloom and others, 1956), which was modified and extended by Sanders (1966) to provide an instrument to assess teacher lesson plans and teaching materials. The work

Figure 2 - Teacher Practices Observation Record*

TOT	I	II	III	TEACHER PRACTICES
				A. NATURE OF THE SITUATION
				1. T occupies center of attention.
				2. T makes p center of attention.
				3. T makes some thing as a thing center of p's attention.
				4. T makes doing something center of p's attention.
				5. T has p spend time waiting, watching, listening.
				6. T has p participate actively.
				7. T remains aloof or detached from p's activities.
				8. T joins or participates in p's activities.
				9. T discourages or prevents p from expressing self freely.
				10. T encourages p to express self freely.
				B. NATURE OF THE PROBLEM
				11. T organizes learning around Q posed by T.
				12. T organizes learning around p's own problem or Q.
				13. T prevents situation which causes p doubt or perplexity.
				14. T involves p in uncertain or incomplete situation.
				15. T steers p away from "hard" Q or problem.
				16. T leads p to Q or problem which "stumps" him.
				17. T emphasizes idealized, reassuring, or "pretty" aspects of topic.
				18. T emphasizes realistic, disconcerting, or "ugly" aspects of topic.
				19. T asks Q that p can answer only if he studied the lesson.
				20. T asks Q that is not readily answerable by study of lesson.
				C. DEVELOPMENT OF IDEAS
				21. T accepts only one answer as being correct.
				22. T permits p to suggest additional or alternative answers.
				23. T expects p to come up with answer T has in mind.
				24. T asks p to judge comparative value of answers or suggestions.
				25. T expects p to "know" rather than to guess answer to Q.
				26. T encourages p to guess or hypothesize about the unknown or untested.
				27. T accepts only answers or suggestions closely related to topic.
				28. T entertains even "wild" or far-fetched suggestion of p.
				29. T lets p "get by" with opinionated or stereotyped answer.
				30. T asks p to support answer or opinion with evidence.

Figure 2 - Continued

TOT	I	II	III	
				D. USE OF SUBJECT MATTER
				31. T collects and analyzes subject matter for p.
				32. T has p make his own collection and analysis of subject matter.
				33. T provides p with detailed facts and information.
				34. T has p find detailed facts and information on his own.
				35. T relies heavily on textbook as source of information.
				36. T makes a wide range of information material available.
				37. T accepts and uses inaccurate information.
				38. T helps p discover and correct factual errors and inaccuracies.
				39. T permits formation of misconceptions and over-generalizations.
				40. T questions misconceptions, faulty logic, unwarranted conclusions.
				E. EVALUATION
				41. T passes judgment on p's behavior or work.
				42. T withholds judgment on p's behavior or work.
				43. T stops p from going ahead with plan which T knows will fail.
				44. T encourages p to put his ideas to a test.
				45. T immediately reinforces p's answer as "right" or "wrong."
				46. T has p decide when Q has been answered satisfactorily.
				47. T asks another p to give answer if one p fails to answer quickly.
				48. T asks p to evaluate his own work.
				49. T provides answer to p who seems confused or puzzled.
				50. T gives p time to sit and think, mull things over.
				F. DIFFERENTIATION
				51. T has all p working at same task at same time.
				52. T has different p working at different tasks.
				53. T holds all p responsible for certain material to be learned.
				54. T has p work independently on what concerns p.
				55. T evaluates work of all p by a set standard.
				56. T evaluates work of different p by different standards.
				G. MOTIVATION, CONTROL
				57. T motivates p with privileges, prizes, grades.
				58. T motivates p with intrinsic value of ideas or activity.
				59. T approaches subject matter in direct, business-like way.
				60. T approaches subject matter in indirect, informal way.
				61. T imposes external disciplinary control on p.
				62. T encourages self-discipline on part of p.

*Developed by Dr. Bob Burton Brown, Institute for Development of Human Resources, College of Education, University of Florida, Gainesville, Florida.

of the Florida group has consisted of converting Sanders' instrument to one for live observation in the classroom, and of carrying out developmental work with it in classrooms. The levels into which cognitive activity is divided are:

1. Memory. The student is expected to recognize or remember information. He is not expected to compare, relate, or alter the material on his own.

2. Translation. At this level, the student is expected to alter the form of the material with which he is dealing -- figurative to literal, behavioral to verbal, verbal to quantitative, pictorial to verbal, or abstract to concrete -- but not to change or evaluate the ideas represented.

3. Interpretation. The student is expected to identify similarities or differences, to compare on some other basis, to relate supporting evidence to a generalization, or to carry out a specified operation.

4. Application. The student is expected to bring together, without instruction, previously learned material which relates to a problem. Examples would include using word-attack skills to sound out a word, or deciding what mathematical operation is appropriate to solve a problem and carrying it through.

5. Analysis. This category is concerned with consciously applying the rules of thinking or of logic to the analysis of a problem, or with inferring feelings or motives.

6. Synthesis. This level involves bringing ideas together, as in application, but with the added requirement that the student reorganizes or changes them in such a way as to produce something new. Original productions of various sorts would be classified here.

7. Evaluation. This level requires two functions: establishing a set of criteria which are relevant to evaluate an idea or a product, and then evaluating the product or idea against these criteria.

In the development of the original instrument, data were collected from approximately 120 teachers using this system in parallel with the Reciprocal Category System, and the Teacher Practices Observation Record. Analysis has indicated meaningful relationships with the other instruments (Wood, 1969; Bane, 1969).

Although the initial research plan anticipated using the original form of the instrument, it was found difficult to apply to kindergarten-first grade classrooms, and a new version of the instrument was developed. The modification was developed in two stages. First, observers who had visited the classrooms developed items to represent the levels of the Taxonomy from their memory of the classrooms. Then these items were tried out in tape listening, new ones developed as needed, and old ones modified or redefined. When the items stabilized, the form of the instrument was fixed and tape coding was begun (see Figure 3).

Figure 3 - Florida Taxonomy of Cognitive Behavior
K-1 Form

Teacher _____ Program _____

T / P	T / P	T / P	
			1. Memory
/	/	/	a. Repeats from memory
/ /	/ /	/ /	b. Repeats other
/ /	/ /	/ /	c. Repeats in sequence
/ /	/ /	/ /	d. Choral response
/	/	/	e. Spells
/ /	/ /	/ /	f. Gives, receives information
/ /	/ /	/ /	g. Seeks information
			2. Translation
/	/	/	a. Sounds letters
/ /	/ /	/ /	b. Names pictures, objects, color, letter
/ /	/ /	/ /	c. Copies letter, number, word (learned)
/ /	/ /	/ /	d. Gives, follows directions
/ /	/ /	/ /	e. Describes activity, picture, etc.
/	/	/	f. Reports experience (2+ thoughts)
/ /	/ /	/ /	g. Describes situation, event
/	/	/	h. Recognizes word (sight reads)
/	/	/	i. Translates one language to another
/	/	/	j. Asks, gives permission
			3. Interpretation
/	/	/	a. Sounds out word
/	/	/	b. Classifies (1 attribute)
/	/	/	c. Counts
/	/	/	d. Adds, subtracts
/	/	/	e. Uses units, tens
/	/	/	f. Compares letters, numbers
/ /	/ /	/ /	g. Copies letter(s), number(s), learning
/	/	/	h. Gives class name (vehicle, etc.)
/	/	/	i. Identifies similarities, differences
/	/	/	j. Asks, gives reason
/	/	/	k. Names sensation
/	/	/	l. Performs learned task or process
/	/	/	m. Relates terms (of one-first)
/	/	/	n. Makes comparisons

Figure 3 - Continued

Activity _____ Teacher _____ Program _____

T / P	T / P	T / P	
			4. Application
/	/	/	a. Classification (2+ attributes)
/	/	/	b. Directs learning game
/	/	/	c. Creates arithmetic problem
/	/	/	d. Writes, types sentence
/	/	/	e. Asks, tells who, what, where, etc.
/	/	/	f. Seriates (alphabetizes)
/	/	/	g. Applies previous learning to new situations
/	/	/	h. Reads
			5. Analysis
/	/	/	a. Verifies equation balance
/	/	/	b. Infers feeling or motive
/	/	/	c. Infers causality (tells why)
/	/	/	d. Cites evidence for conclusion
			6. Synthesis
/	/	/	a. Elaborates on picture, story, etc.
/	/	/	b. Proposes plan or rule
/	/	/	c. Play acts
/	/	/	d. Makes up story
/	/	/	e. Makes fantasied object
/	/	/	f. Makes common object
/	/	/	g. Draws, colors common object
/	/	/	h. Draws, colors fantasied object
			7. Evaluation
/	/	/	a. Compares with criteria, rule or plan

*This is an experimental form which should not be cited or used without permission of the developers.

The usual recording procedure used with a sign system was modified as well. Ordinarily, an item is tallied only once in an observation period, but it seemed possible that the high rate of pupil response which is emphasized in some programs might be seriously under-represented. As a consequence, the procedure of tallying every three seconds (or each interaction) was followed. Since conventional sign data typically discriminate effectively (and, in fact, were found to do so for FLACCS and the TPOR in these data), the data of the Cognitive Taxonomy were also analyzed with each observation period scored zero or one (for any nonzero frequency, regardless of size). Since the latter data appeared to be at least as discriminating, only those are reported, and zero or one recording was employed with the second and third year's data. As with the first two instruments, both program discrimination and relations with pupil growth were significant the first year, as were program discriminations the second year (Soar, 1971).

A superficial consideration of the cognitive domain sometimes suggests that its higher levels are more appropriate for older pupils than younger. Yet attention to the cognitive activities of classrooms showed that activities, at least through the middle levels of the instrument, occurred fairly frequently. The difference, of course, is that simpler materials and concepts are involved. The development of a Piagetian concept such as conservation falls at the level of synthesis, and the discussion that accompanies a story or a reading lesson may deal with questions such as, "What else might Jimmy have done?" (synthesis), or "Would it have been better if Jimmy had done something different? Why?" (evaluation).

The complexity of the concepts and the nature of the subject matter will differ from age to age, of course, but higher level thought processes seem clearly to be an important part of the development of the young child.

In fact, an idea that became more compelling as the instrument was developed was that much of the learning done by pupils in the lower grades is learning how to do processes that occur with little thought for older pupils. For example, the item "Reads" is at the lowest cognitive level in the general purpose instrument, but is a high level item for pupils at the kindergarten, first grade level. Deriving the multiplication table is a demanding operation, but as a tool in use it is low level, and becomes most useful when it reaches the level of memory. Indeed, a realization that emerged which seems paradoxical in some ways, is that a part of the process of education consists of making higher level behaviors lower level. That is, an activity which is initially complex, such as reading, becomes a lower level one as it becomes automatic and routine. Thus, a goal of the educational process is to make complex operations so well learned that they become low level operations, and tools in turn for other higher level operations.

Reciprocal Category System - The work with the original system (Flanders Interaction Analysis) has been summarized by Flanders (1965, 1970), and Amidon and Hough (1967). There are a number of modifications of the system, but only the one used in this research will be discussed here.

The modification by Ober, Wood, and Roberts (1968) offers a number of advantages over the original. The seven teacher categories of the Flanders System

have been expanded to nine (see Figure 4): teacher lecture is divided into that which is responsive to pupils, and that which is teacher initiated; and the category of teacher criticism has been divided into a category for correction without criticism, and one for criticism. Category 10 remains silence and confusion as before. The major advance, however, is reformulating each of the categories so that it can be used for pupil talk as well as for teacher talk. That is, teacher amplification of a pupil's idea is categorized as a 3; a pupil amplification is a 13. Each category is changed from a teacher category to a pupil category by adding a "1" as the first digit. The observer, then, learns nine categories as he did with the Flanders System but has 18 to work with and, as a consequence, the same variety of pupil talk is recorded as teacher talk. This permits identifying the extent to which pupils do such things as maintain order in the classroom, correct subject matter misunderstandings of other pupils, build on each other's ideas, contribute information, or express and accept feeling in the classroom. Practically speaking, this modification offers more than twice the richness of the data provided by the original Flanders System at little increase in the complexity of the observer's task. In the second and third year's data, Silence and Confusion were broken into two categories -- Silence (10) and Confusion (20).

In using the Reciprocal Category System, an observer enters the classroom (or begins a tape), spends a few minutes getting the feel of what is going on, and then begins to write, at least every three seconds, the category number which best describes what is going on at that moment. If the activity changes within three seconds, a new category is recorded. As a consequence the observer can sometimes record four or five categories in as many seconds. While this seems a very difficult job, eight to twelve hours of training make it relatively straightforward.

A strength of this procedure (initiated in Flanders' work) is the capturing, one step at a time, of the sequence of occurrences in the classroom, by the way the categories are tabulated into a matrix. It then becomes possible to answer such questions as, "What does the teacher typically do when a pupil stops talking?" "What kinds of teacher behavior are followed by pupil responses?" "Does a teacher respond differently to a pupil initiation than she does to a pupil response?" "What proportion of the teacher talk is made up of criticism of pupils, followed by directions?"

One of the interesting aspects of the matrix the RCS system produces is that it breaks down into four submatrices: teacher-teacher talk, teacher-pupil talk, pupil-teacher talk, and pupil-pupil talk. Along with this increased richness of the data, the possibility is retained of returning the data to that of the Flanders System by pooling categories. As a consequence, relationships of these data to the store of information accumulated under the Flanders System can be studied easily.

The original instrument is probably the best validated of any, if validity is defined in terms of the prediction of change in pupils. The relevance of teacher behavior as measured by this instrument to pupil achievement growth has been widely studied, and relationships with pupil attitudes have also been found. A smaller number of researches show the validity of the instrument for predicting such things as pupil change in personality, growth in creativity, and perceptions

Figure 4 - Summary of Categories for the Reciprocal Category System

Category Number Assigned to Party 1[1]	Description of Verbal Behavior	Category Number Assigned to Party 2[2]
1	"WARMS" (INFORMALIZES) THE CLIMATE: Tends to open up and/or eliminate the tension of the situation; praises or encourages the action, behavior, comments, ideas and/or contributions of another; jokes that release tension not at the expense of others; accepts and clarifies the feeling tone of another in a friendly manner (feelings may be positive or negative; predicting or recalling the feelings of another are included).	11
2	ACCEPTS: Accepts the action, behavior, comments, ideas and/or contributions of another; positive reinforcement of these.	12
3	AMPLIFIES THE CONTRIBUTIONS OF ANOTHER: Asks for clarification of, builds on, and/or develops the action, behavior, comments, ideas and/or contributions of another.	13
4	ELICITS: Asks a question or requests information about the content subject, or procedure being considered with the intent that another should answer (respond).	14
5	RESPONDS: Gives direct answer or response to questions or requests for information that are initiated by another; includes answers to one's own questions.	15
6	INITIATES: Presents facts, information and/or opinion concerning the content, subject, or procedures being considered that are self-initiated; expresses one's own ideas; lectures (includes rhetorical questions -- not intended to be answered).	16
7	DIRECTS: Gives directions, instructions, orders and/or assignments to which another is expecred to comply.	17
8	CORRECTS: Tells another that his answer or behavior is inappropriate or incorrect.	18
9	"COOLS" (FORMALIZES) THE CLIMATE: Makes statements intended to modify the behavior of another from an inappropriate to an appropriate pattern; may tend to create a certain amount of tension (i.e., bawling out someone, exercising authority in order to gain or maintain control of the situation, rejecting or criticizing the opinion or judgment of another).	19
10	SILENCE: Pauses, short periods of silence.	
	CONFUSION: Periods of confusion in which communication cannot be understood.	20

[1]Category numbers assigned to Teacher Talk when used in classroom situation.
[2]Category numbers assigned to Student Talk when used in classroom situation.

of the nature of the classroom (Soar, 1966). In the first year's data, the instrument discriminated between programs and related to pupil growth. In the second year's data, it discriminated programs, but pupil data were too limited to draw conclusions (Soar, 1971).

Global Ratings - In addition to the observation instruments described above, which were completed on the basis of successive five-minute periods of observation, two additional schedules were used. At the beginning of the day, the observers filled out the first part of the classroom description (Figure 5), counting adults and children as well as interest centers and other physical aspects of the classroom. After the day's observation had been finished, the observers completed the remainder of this instrument, recording the time pupils spent in various activities such as meals and snacks, or focused learning with or without an adult.

The observer also made a series of global ratings at the end of the day covering broad aspects of classroom process including the response of pupils and adults to the observers themselves (Figure 6).

Observers, Training and Data Collection Schedule

Two sets of data were collected: the major study in which 289 teachers were observed during the winter, and a small study in which 17 teachers were observed twice in the fall as well as in the winter. The major data set was collected between the second week of January and the middle of March, assuming that this period would be most representative of the year as a whole. Observers had been trained in a course during the fall quarter; the first week of January was spent in refresher training with a day in Follow Through classrooms in Jacksonville, and data collection began the second week. All teams observed then in Philadelphia, since the number of classrooms there was large enough that all nine teams could work at the same time and could meet after each day's observation to discuss questions raised and agree on common procedures. This week represented the transition from training to full-scale work in the field. Seven teams of two observers each were used, consisting of graduate students and research assistants, in addition to two part-time teams of central office staff.

Reliability data were collected during the week of refresher training at the beginning of data collection, and again at the end of data collection.

The data set collected in the fall was intended to permit relating the early organization of the classroom to its status at midyear. A subsample of 20 teachers was selected from the second year's FLACCS data, ten on the basis of a high score on a control dimension in the previous winter observation, and ten on the basis of low scores. Three teachers were lost because strikes delayed the opening of school and ultimately resulted in sufficient tension in the school system that it seemed better not to observe there as school began. The 17 teachers were observed the first week of school (often on the first full day of school), and again in late October or early November, as well as being observed during the winter as part of the total sample of 289 teachers.

Figure 5 - Classroom Descriptions

Column		
1-3	____	Deck No.
4-5	____	Program
6-7	____	Teacher's Names
8	____	Grade Level (0=K; 1=Ent. First; 2=Cont First; 3=2nd)
9,10	____	Observer$_1$ 01 Dr. Soar 05 Dee 09 Henry 13 Keith 17 Rose
11,12	____	Observer$_2$ 02 Mrs. Soar 06 Eileen 10 Jeff 14 Marge 18 Wayne
		03 Barbie H. 07 Gene 11 John 15 Mary
		04 Barbara M. 08 Harriet 12 June 16 Pat
13,14	____	No. of Children Registered
15	____	No. of Adults
16	____	Largest pupil ethnic group present (1=Negro)
17,18	____	Number (2=Anglo-S)
19	____	Second largest pupil ethnic group present (3=Indian)
20,21	____	Number (4=Spanish American)
22	____	Third largest pupil ethnic group present (5=Other)
23,24	____	Number
25	____	Teacher ethnic group_____
26	____	Major aide ethnic group_____
27	____	Number
28	____	Second aide ethnic group_____
29	____	Number
30	____	Sexes (1)___Male (2)___Female (3)____Both
		Physical Arrangement
31	____	Rows _____(check) 1 if checked
32	____	Tables and rows_____(check) 0 if not checked
33	____	Small group tables_____(Check)
34	____	Number of reading centers
35	____	Number of interest centers
36	____	Size of Community (will be filled in later)
37,38	____	School Hours: Daily_____to_____
39,40	____	Meals & Snacks: Breakfast____to____; Lunch____to_____
		AM Snack____to____; PM Snack____to____
41,42	____	Structured Learning with Teacher (opening exercises, lessons, etc.)
43,44	____	Structured Learning without Teacher (desk work, workbook, etc.)
45,46	____	Unstructured Time (free play, recess, etc.)
		Above 5 items have 2 columns; one decimal
		Example: 5 hrs 30 min=5.5; 40 minutes=0.7; 15 minutes=0.3
47,48,49,50	____	Size of Classroom _____ft. x _____ft. (total square ft.)
51	____	Carpet 0 = none 2 = large rug (1/3 area or more
		1 = small rug 3 = wall to wall
52	____	Soundproofing 0 = none; 1 = yes
53	____	Number of years of previous school experience of the typical child in the class (include Headstart years)
54	____	Number of years the teacher has had these same children in her class previously. (0=not before this year; 1=one year previous to this etc.)
55	____	Other Grades in this Classroom (Use grade code w. Column 8)

Figure 6 - Classroom - Global Ratings

Pupil Groupings

Fixed and regular for activities	Mostly fixed	Emerge about half the time; fixed half the time	More often emerge spontaneously	Usually emerge spontaneously
1	2	3	4	5

Pupil Differentiation

Almost always work at same activity	Most work at same activity most of the time	Most work at same activity half of the time	Work at different activities more often than not	Usually work at different activities
1	2	3	4	5

Teacher Voice Inflection

Variable and lively	____	Average variability	____	Flat, dead, monotonous
5	4	3	2	1

Pupil Reinforcement

From other pupils:	Never	Rarely	Occasionally	Frequently	Almost constantly
	1	2	3	4	5
From adults:	Almost constantly	Frequently	Occasionally	Rarely	Never
	5	4	3	2	1
From materials:	Never	Rarely	Occasionally	Frequently	Almost constantly
	1	2	3	4	5

Pupil Self-Control

Pupils:	Rarely show self-control	_____	Occasionally show self-control	_____	Generally show self-control
	1	2	3	4	5

Figure 6 - Continued

Pupil Freedom

Pupils are:	Rarely free		Occasionally free		Generally free
	1	2	3	4	5

Extent to which activities having clear cognitive focus characterize the classroom:

Rarely occur	About 1/4 of the time	About 1/2 of the time	About 3/4 of the time	Occur almost constantly
1	2	3	4	5

Extent to which "game-like" activities with clear cognitive focus characterize the classroom:

Almost constantly	About 3/4 of the time	About 1/2 of the time	About 1/4 of the time	Rarely occur
5	4	3	2	1

Overall Emotional-Attitudinal Climate

Highly positive	Positive most of the time	Neither positive nor negative	Negative Occasionally	Highly Negative
5	4	3	2	1

Children appear extremely happy and/or satisfied	Most pupils appear happy and/or satisfied much of time	About half appear happy and/or satisfied much of the time	Occasionally pupils appear unhappy and/or satisfied	Children appear extremely unhappy and/or dissatisfied
5	4	3	2	1

Data Collection Procedure

The data collection procedure called for a team to spend a full day in the classroom. Teams arrived at their schools early so as to meet the teacher before school began (although delay at the school office sometimes prevented the early meeting with the teacher). As the class was getting under way, observers filled out the first part of the classroom description, and then began the observation. One observed using FLACCS, the other the TPOR. Then, after completion of two instruments, the observers changed instruments and completed two more. Simultaneously with each observation, the observers also made a tape recording, which was later coded on the RCS and Cognitive Taxonomy. During recess or a free-play period, the observers measured the classroom and talked with the teacher so as to permit her to ask any questions she wished about the observation. After the day was over, the remainder of the classroom description and the global ratings were completed.

All of the tape recordings were obtained by observers moving about as inconspicuously as possible, carrying a small battery powered tape recorder. Although the distraction to the pupils was somewhat increased initially, it soon declined and seemed generally not to be a source of difficulty.

In a free-play setting in a classroom with hard walls, floor, and ceiling, it was difficult to obtain an intelligible recording. However, an observer actually present in the classroom would not be able to understand much of the interaction in such a setting either. In general, the recording procedures finally adopted seemed to produce tape which was as understandable to a coder as the live situation was to the observer. The details of equipment and procedure are presented in Appendix A.

Apart from the technical difficulties of making recordings in classrooms, there were other difficulties. The typical Follow Through classroom is an unusually diverse one in terms of the variety of activities going on simultaneously. This, in turn, means that the complexity of the observer's task is increased several-fold over what it would be in a traditional classroom. Even with two observers watching for different classes of behaviors, it is inevitable that some portion of what occurred in the classrooms went unobserved. On the other hand, with the number of periods observed, the hope that the classroom would be fairly accurately represented seemed reasonable.

Another frequently occurring pattern of behavior made the observer's task difficult. In many classrooms, half a dozen or more small groups of pupils would be at work on different tasks, with adults with a number of the small groups. The typical behavior of the adult was to speak softly so as not to disturb other groups nearby. Pupils, to a greater or lesser degree, tended to follow this same pattern. As a consequence, it was frequently difficult to hear interaction between teacher and pupils in a subgroup or to tape record it. The effect was a quiet group in a noisy room, or perhaps one not so much noisy as busy. At the extreme, but not uncommonly, it was possible to sit directly at the elbow of a teacher working with individual pupils and be unable to hear a word that was said between the teacher and the pupil.

The activities coded from tape suffer a further disadvantage in that they represent only the verbal activities in the classroom. This is not a particular problem with the Reciprocal Category System (RCS), since it is intended to record only verbal activities anyway. But for the Cognitive Taxonomy this is a somewhat greater disadvantage. A child may be working with cuisinaire rods, building a stack of blocks with a repeating sequence of colors, or carrying out a classification task by himself, and there would be no record of the cognitive complexity of this behavior recorded on the tape. To the extent that programs differ in the proportion of the learning activities that take place in verbal interaction, their representation on the Cognitive Taxonomy will differ.

On the other hand, the data collected from tape is relatively inexpensive in comparison to the cost of live data, so that it need add relatively little information to be justified.

On the whole, the data recorded live are probably reasonably representative of the classrooms observed, although certainly less than complete. The data taken from tape are probably less representative, and this will need to be recognized in the interpretation of the results.

Effect of the Observer on the Data Collected

The "conventional wisdom" of workers in this area seems to be that the observer soon becomes part of the woodwork for the pupils, if he never interacts with them and never takes part in any of the activities of the classroom (Medley and Mitzel, 1963). He probably ceases to be a matter of concern for the teacher much more slowly for most teachers; is never a concern for some teachers, and probably never ceases being a concern for others.

Only recently have empirical data appeared on the question. Masling and Stern (1969) observed two full days in each of 23 fourth and fifth grade classrooms, and correlated observational measures at differing separations in time from each other. They hypothesized that the effect of the observer should diminish in time, so that later observations should correlate more highly with each other than early ones would with late ones. They comment, "These correlations show no discernible pattern over time," and conclude that two interpretations of the data are possible:". . . (a) observer influence is negligible. . . (b) the effects of the observer are more complex than had been foreseen and affect various aspects of teacher and pupil behavior differentially. It is difficult to tell from the present data which conclusion is more appropriate or even if both cannot legitimately be made" (p. 353).

Samph (1968) made tape recordings without the teacher's knowledge, and compared these to behavior recorded live by an observer. Teachers' agreement to participate in a study of pupil behavior was obtained, four microphones were installed in each classroom, and teachers were told that recording would not be begun until after pupils had had time to get used to the presence of the microphones. A month later teachers were told that recording would soon begin, but it had actually begun ten days after the microphones were installed. During this early period, control or baseline data were collected, using Flanders Interaction

Analysis. Following this, observers collected live data. After the completion of data collection, teachers were informed of the deception and their permission to use the data was solicited. Teachers were also asked to indicate the style of teaching they thought ideal on the same dimensions studied in the research.

The finding of primary relevance to this report is the comparison of the baseline data to data collected by a previously scheduled observer in the classroom. Five variables from Flanders Interaction Analysis were tested for significance of change (all comparisons were in terms of deviations of each teacher from her own ideal). Significant change was found for two of the five variables: the amount of praise produced by the teacher increased when an observer was present, and the amount of criticism decreased. In each case the difference between means for the control and experimental conditions was about three-quarters of a standard deviation. Again, this is the variability of differences between observed and ideal behavior for individual teachers, and probably is much smaller than the variability of behavior across teachers.

None of the other three variables showed significant change. They were the total of teacher acceptance of pupil's ideas, the I/D ratio (the ratio of the teacher's acceptance of feeling, praise, acceptance of ideas and questioning to her lecturing, giving directions, and criticizing), and the i/d ratio (similar to I/D, but omitting questions and lecture, the primarily substantive categories). The changes were roughly a third of a standard deviation or less for these latter differences.

It seems reasonable to assume that teaching is a difficult and complex task, and that altering one's style is easiest for the more obvious aspects, such as praising pupils more and criticizing them less. By this interpretation the more complex measures of teacher behavior may have changed little, either because most teachers do not teach by a conceptual scheme that includes them, or because they are more difficult to monitor.

Overall, even the statistically significant changes do not appear great in terms of the variability of behavior from teacher to teacher, so that it seems reasonable to assume that teacher behavior does not change greatly as a consequence of the presence of an observer. If the change a teacher makes is in the direction of a truer implementation of her philosophy as Samph's study suggests, and if programs in Follow Through follow different philosophies, then the effect of an observer should be to sharpen program differences. But when it is recognized that the present study is analyzing approximately 400 items of classroom behavior, it seems reasonable to hope that not many of them were affected very much.

Analysis of Observational Data

The first step in the analysis of each major (winter) set of observational data was to calculate means and standard deviations for each of the items, for all teachers. Items with very small means and/or variances were then either eliminated or pooled with related items. Following this procedure, an area transformation was carried out item by item to make the data as nearly normally distributed as possible, and with approximately equal variabilities. The first of these considerations seemed important since many items showed essentially "J-curve"

distributions; and equality of variances was important because incomplete factor scores were to be calculated later which would involve simply summing and averaging a series of items of behavior without further weighting.

The data for each observation system were next factor analyzed separately using principle components factor extraction with multiple R squared in the diagonal, followed by varimax rotation of a series of numbers of factors. Rather than relying on one or more of the various rule-of-thumb criteria for number of factors to rotate, a series of factors were rotated, and the output interpreted. The number of factors rotated which seemed to offer the clearest set of interpretations was retained; although on several occasions additional series of factors were rotated, seeking greater clarification. Earlier research (Soar, 1966) had suggested that the usual criteria for selecting number of factors to rotate are not functional for observational data of this sort, and the results for these analyses continue to support that conclusion. Examination of the eigenvalues, for example, shows that few factors were retained for which the eigenvalue was less than three, and even fewer for which it was less than two. When factors were rotated to eigenvalues near one, as is common, the factors seemed unreasonably fractionated, or uninterpretable.

After the decision had been reached about the number of factors to be rotated for each observation schedule, incomplete factor scores were calculated by simply pooling the T-scores for those measures which loaded $\pm$ .40 or above on each of the factors. Although Glass and Maguire (1966) have criticized this procedure, Horn's comments (1965) seem more compelling. He points out that factor analysis, as any other least squares estimating procedure, will capitalize on idiosyncratic variance, and that small numbers of subjects and large numbers of measures aggravate this problem. As a consequence, validity shrinkage on cross-validation becomes extensive. The incomplete factor score procedure cited above minimizes the effects of idiosyncratic variances and validity shrinkage. It does so at the cost of permitting factors to be correlated, rather than orthogonal, as complete factor scores would be. This is the major criticism made by Glass and Maguire, but since this assumption is typically made only for computational convenience, it seems the much less compelling issue of the two. Following the calculation of factor scores, differences between program and grade level means were tested using Duncan's new multiple range test (Dixon, 1970), and the factor scores were related to classroom mean pupil gain.

In addition to the orthogonal rotations described above, oblique rotations were also carried out with each set of data for the first year using the simple loadings procedure (Jennrich and Sampson, 1966). In no case for any set of data did two factors correlate as highly as .3, and correlations above .2 were quite rare, so that the varimax rotations were retained in all cases. (This conclusion applies to the complete rotated factors, not the incomplete factor scores). On this basis, only orthogonal rotations were used in the second and third year's data.

Since the number of items in FLACCS is large, the Affect and Control sections were factor analyzed separately, and the highest loading items from the two analyses then entered into a joint analysis. The rating scales and classroom description items were also correlated with the classroom mean pupil gain measures for the third year's data.

Analysis of fall data - In addition to the major data set collected during the winter, a subsample of teachers was observed in September, and late in October or early in November, as well as being part of the winter sample. These observations were T-scored on the same distributions obtained from the winter data, and reduced to factor scores using the same structure. Then, since the data were collected to examine both similarities and differences, they were analyzed by a repeated measures analysis of variance, and by correlating across the three time intervals. In addition, a measure of stability of teacher behavior (Medley and Mitzel, 1963; McGaw, Wardrop, and Bunda, 1972) was computed by Hoyt's (1955) formula 5.

Analysis of Pupil Data

The third year, SRI administered test batteries consisting of half-length standardized tests, as well as experimental tests assembled from items provided by sponsors to represent their objectives. Kindergarten classes were given the Lee-Clark Reading Readiness Test, two of the subtests from the N.Y.U. Early Childhood Inventory, the Caldwell-Soulc Pre-School Inventory, the Wide Range Achievement Test, and a self-concept measure. Entering first grade classes (those without kindergarten experience) were given the same battery, plus the Metropolitan Readiness Test and a book of sponsor items. Nonentering first grade pupils (those with experience in Follow Through kindergartens) were given the Metropolitan Readiness Test, two tests made of items supplied by sponsors, the Wide Range Achievement Test, and the same self-concept measure. Second grade pupils were administered subtests or items from the Metropolitan Readiness and Achievement Tests, the Stanford Achievement, the Wide Range Achievement Test, and a measure of test anxiety.

Analysis of the pupil data proved materially more difficult and uncertain than analysis of the observation data. Perhaps this should have been expected, in the light of Bereiter's (1963) comment:

> "Although it is commonplace for research to be stymied by some difficulty in experimental methodology, there are really not many instances in the behavioral sciences of promising questions going unresearched because of deficiencies in statistical methodology Questions dealing with psychological change may well constitute the most important exceptions. It is only in relation to such questions that the writer has ever heard colleagues admit to having abandoned major research objectives solely because the statistical problems seemed to be insurmountable." (p. 3).

Various procedures were tried and abandoned, but a few conclusions have been provisionally accepted.

1. Pupil data should be analyzed into measures differing in degree of complexity or abstractness, since there is considerable independence of these measures, and since past work suggests that different learning objectives respond best to different teacher behaviors (Soar, 1968, 1971, 1972; Soar and Soar, 1972).

2. Pupil measures should be analyzed using gain measures rather than measures of pupil standing at some point in time.

3. The shape of the relation between pupil pretest and gain should be studied before other analyses are carried out.

4. Regressed gain should be calculated separately for subgroups whose pretest means differ (cf, socio-economic status groups, ethnic groups), which is not usually done when analysis of covariance is applied.

Analysis of status vs gain scores - Analysis of the subtest scores from the first year's data had indicated that the factor structure of regressed gain scores was appreciably different from that of either pre or postscores. It was only in the analysis of regressed gain scores that the simple-complex structure emerged clearly. It seems reasonable that if one is interested in gain, he should analyze gain. As Bereiter (1963) has indicated, items which are selected to measure standing at some point in time are likely to be items which are quite stable, and consequently not good measures of change. It seems possible, then, that the factor analyses of regressed gain measures in the first year's data may have been identifying measures which were more sensitive to change than those which failed to load.

These several considerations led to the assumption that the analysis of items and subtests to create new pools in the second year's data paralleling the first year factors should be done using measures of change. The difficulty with this procedure, however, was the cumulative loss of reliability from two sources: change measures are much less reliable than the status measures from which they are derived, and items are less reliable than subtests.

In one sense the use of the term "items" is inappropriate in that a number of items on the WRAT (for instance, Word Reading, N = 20) have as long or longer scales than subtests of the Metropolitan (Word Meaning, N = 7). But there were items with one and two point scales.

The second-year analyses - Before items were factor analyzed the second year, those which "topped out" or had very low variability were eliminated. Despite the problems of measures with varying scale length occurring in the same analysis and the reliability problems cited earlier, reasonably clear structures were obtained from factor analyses of the kindergarten and entering first grade, analyzed separately. In addition to the simple and complex factors found the first year, a third factor emerged which appeared to represent skills-learning such as reading, spelling, and arithmetic. It was apparently associated with the addition of the Wide Range Achievement Test (WRAT), which is heavily weighted with these skills.

For the nonentering first grade data, items and subtests which were low in variance but appeared to be abstract came together with other low-variance items which appeared to measure simpler kinds of learning, suggesting a factor made up of low variance items. Inspection of the data also suggested a tendency for items to be grouped on the basis of whether they were individually or group administered. Various combinations of items and subtests were combined and factor analyzed, but

no really satisfactory structure emerged. Instead, on the basis of the factor analysis and also a priori judgment, composites of items and subtests were formed to represent group and individually administered, simple-concrete, skill, and complex-abstract measures. An item analysis of all items against these composites was carried out, and items added to the composite accordingly.

The third-year analyses - In the third year's data for kindergarten and continuing first grade where the test battery was unchanged, regressed gain was estimated separately by subgroup for items and for the same composites as the second year, and correlations of item gain with composite gain were calculated to verify item placement in composites. As before, the composite scores were reduced to classroom means, and correlated with classroom observational data.

After these analyses had been completed, study of the regressed gain scores showed widely deviant scores for a few pupils which led to an intensive examination of the regressed gain data. Both ceiling effects and strongly nonlinear relations between pretest and gain scores were found when these relations were plotted. As a consequence, the data were reanalyzed, beginning with composite pre and postscores. It was generally necessary to drop pupils with high pretest scores in order to lessen the ceiling effect (it could not be eliminated in all cases without doing more violence to the sample than seemed wise). In addition, for a number of composites pronounced nonlinearity of relation between pretest and gain still existed, so a program was developed to fit second degree curves to the data, and calculate regressed gain as the deviation from the curve. As before, each analysis, linear or nonlinear, was carried out separately for four subgroups (socio-economic status, defined by Follow Through status, and white and nonwhite).

Following this step, classroom means were again calculated for the regressed gain measures, T-scored, and related to the classroom process factor scores as well as the rating scales and the classroom descriptions. In addition, in order to clarify relations further, pupils were separated into subgroups on the basis of socio-economic status and ethnic group and classrooms were divided on the basis of city size, wherever sample sizes permitted, and relationships of growth to classroom process were reanalyzed.

Each year, classrooms which were known not to be in SRI's sample were observed for the sake of program description. The third year, sufficiently complete data were obtained for 150 classrooms to be included in the analysis of pupil data for all four grade levels. Eliminating pupils with high pretest scores reduced some classroom N's below a level which permitted analysis, however, so the number of classrooms decreased further.

Results: Pupil Data ~~for Kindergarten and Nonentering First Grade~~

The Sample

From the 289 classrooms observed, pupil data were available from SRI for 169 classrooms. The data were initially screened to eliminate pupils for whom complete pre and post achievement data were not available, then were sorted by ethnic group and Follow Through status to obtain the four subgroups of advantaged-disadvantaged, white and nonwhite. A number of additional pupils were lost because these data were incomplete, leaving 150 classrooms for analysis, of which 57 were kindergarten, 20 were entering first, 53 nonentering first, and 20 second grade. The resulting pupil N's, pretest means and standard deviations are shown in Table 6 for kindergarten and nonentering first grade, and Table 7 for entering first and second grade.

The means for the nonwhite advantaged group are not what would be expected for the grade level. Their pretest scores are typically lower than those of the nonwhite disadvantaged, which appears to raise question about the accuracy of the classification. It also seems clear that the pupils for whom socio-economic status data were missing are a relatively able group, with only the white advantaged subgroup tending to earn higher scores.

Pupil Regressed Gain Measures

As described in the procedure section, each year measures of pupil growth differing in complexity or abstractness were sought from the test battery administered by SRI, using factor analysis and/or item analysis. The first year, a clear two-factor solution was found for kindergarten and first grade. The test battery was changed the second year, primarily by the addition of the WRAT, and a three-factor solution was found. The third year, the test batteries for kindergarten and continuing first grade were unchanged, and the three-factor solutions from the second year were applied to the third-year data and tested. A different battery was used for entering first grade, and the second grade data were available for the first time, so new composites were created, using both factor analysis and item analysis against a priori composites.

For the second year's data, in preparation for calculating regressed gain scores for the four subgroups of pupils defined by white, nonwhite (including Mexican-American), advantaged and disadvantaged status (as indicated by qualification for Follow Through services), fall and spring means were calculated for each composite. There did not appear to be a consistent tendency for more growth in whites or nonwhites, or advantaged or disadvantaged groups (Soar, 1971). The small differences that appeared showed no consistent pattern associated with the particular subgroup. This conclusion from the second year data, was supported by tests of differences in regression coefficients for blacks and whites for a subgroup of the first year data (Honeycutt, 1971), which showed one significant difference for 13 comparisons. The t's were often less than 1.

This was a convenience for the statistical analysis, but more important, the implications that it has for education seem important. In the current controversy of whether black or lower class pupils are capable of learning abstract concepts, the finding of such smiliar patterns of growth during the school year

Table 6

Pretest Data for Kindergarten by Subgroup

Composite	Nonwhite Disadvantaged N = 715 $\bar{X}$	Nonwhite Disadvantaged N = 715 S.D.	Nonwhite Advantaged N = 56 $\bar{X}$	Nonwhite Advantaged N = 56 S.D.	White Disadvantaged N = 93 $\bar{X}$	White Disadvantaged N = 93 S.D.	White Advantaged N = 138 $\bar{X}$	White Advantaged N = 138 S.D.	Missing SES N = 60 $\bar{X}$	Missing Data N = 60 S.D.
Concrete	14.96	10.50	13.66	10.10	16.64	9.99	26.51	11.52	23.30	12.90
Skill	1.38	1.45	1.39	1.23	1.45	1.24	2.41	2.27	1.95	2.24
Abstract	19.35	9.69	17.09	10.37	22.65	8.32	28.33	10.40	24.90	13.22

Prestest Data for Nonentering First Grades by Subgroup

Composite	Nonwhite Disadvantaged N = 699 $\bar{X}$	Nonwhite Disadvantaged N = 699 S.D.	Nonwhite Advantaged N = 129 $\bar{X}$	Nonwhite Advantaged N = 129 S.D.	White Disadvantaged N = 93 $\bar{X}$	White Disadvantaged N = 93 S.D.	White Advantaged N = 87 $\bar{X}$	White Advantaged N = 87 S.D.	Missing SES N = 184 $\bar{X}$	Missing Data N = 184 S.D.
Group										
Concrete	3.82	2.67	3.32	2.74	4.19	2.70	5.74	2.12	4.95	2.91
Skill	4.83	3.20	3.53	2.73	5.31	3.56	8.22	3.54	6.24	4.27
Abstract	5.69	3.45	5.74	3.57	7.28	3.90	10.57	3.74	8.02	4.67
Individual										
Concrete	9.48	5.58	9.16	5.46	9.32	5.98	12.15	5.15	12.19	5.59
Skill	5.97	7.91	3.55	4.91	6.14	7.26	10.87	10.28	9.84	12.34
Abstract	4.38	2.19	3.93	2.08	5.04	2.57	6.31	2.15	5.26	2.97

Table 7

Pretest Data for Entering First Grades by Subgroup

Composite	Nonwhite				White			
	Disadvantaged N = 226		Advantaged N = 59		Disadvantaged N = 95		Advantaged N = 38	
	$\bar{X}$	S.D.	$\bar{X}$	S.D.	$\bar{X}$	S.D.	$\bar{X}$	S.D.
Concrete	49.88	4.61	40.60	3.01	50.30	3.81	61.89	6.26
Skill	50.42	6.25	47.49	5.80	50.83	6.06	46.23	5.03
Group Abstract	51.13	7.21	47.40	5.75	45.74	5.19	55.25	4.75
Individual Abstract	49.17	5.95	46.93	6.32	52.32	4.28	50.73	4.85

Pretest Data for Second Grades by Subgroup

Composite	Nonwhite				White			
	Disadvantaged N = 220		Advantaged N = 57		Disadvantaged N = 38		Advantaged N = 51	
	$\bar{X}$	S.D.	$\bar{X}$	S.D.	$\bar{X}$	S.D.	$\bar{X}$	S.D.
Group								
Skill	4.69	2.67	4.50	2.34	5.51	3.05	7.62	2.49
Abstract	4.45	1.45	4.51	1.18	5.03	1.72	6.05	1.21
Individual								
Concrete	8.44	2.77	8.86	2.44	8.42	2.97	9.79	1.55
Skill	3.92	3.11	3.24	2.47	4.54	3.79	7.20	2.66
Abstract	.73	.40	.60	.36	.93	.53	1.22	.40

is very reassuring. The nonwhite subgroups did start at a lower position and finish at a lower position that did white subgroups; and lower social status groups started and finished in lower positions than higher socio-economic groups did, but growth during the year appeared to be similar. These results appear to agree with those of Hayes and Grether (1969), who found that the major differences between social status groups in the amount of academic growth that took place during elementary school occurred during the summers, rather than during the school year. In their data, slopes representing growth during the school year were essentially parallel across socio-economic status groups, but they diverged during the intervals representing the summers. These data agree in general with that conclusion.

Kindergarten composites - Kindergarten regressed gain composites were formed on the basis of the second year's analysis. The correlation of item regressed gain with these composite regressed gain scores are shown in Table 8. The starred items are those which entered the composite on the basis of the previous year's analysis, and it can be seen that the correlations of items with these composites agreed with the placements developed the previous year. Every item would be identically placed. This appears to be strong support for this method of combining the pupil data.

The correlation between the Concrete and Abstract composites was .61, Abstract with Skill was .20, and Concrete with Skill was .16. Skill is clearly independent of the other two, but the relation between Abstract and Concrete is surprisingly high and difficult to explain. Two items -- 14 points -- were assigned to both composites by the second year's factor analysis, but of course that occurrence only underlines the question of why the domains are so closely related. Perhaps the difference between Skill and the other two measures may partly be a function of curriculum differences among kindergartens. Some kindergartens teach specific academic skills, and some do not, but in most kindergartens pupils meet such concrete activities as naming letters and numbers, and the abstractions of storytime and creative activities.

Nonentering first grade composites - For the nonentering first grade data for the second year, composites were created by item analysis, using criterion item groups created by both a priori and factor analytic procedures. In preliminary analyses of the data, the items tended to break up into those which had been individually administered and those which had been group administered. As a consequence, Simple-Concrete, Skill, and Complex-Abstract composites were created separately for each mode of administration. The correlation of items with composites for the current data is shown in Table 9. Again, agreement is high. Item 34 would have been added to Individual Simple-Concrete on the basis of its correlation; but it is a subitem to item 24, and would add little to the composite, so the data were not rescored.

The measures are all relatively independent of each other (Table 10). There are moderate correlations between Individual and Group Skill, and Individual and Group Concrete, but Individual and Group Abstract are not related. The relations between items and composites suggest that the low intercorrelations between composites are not due to lack of reliability (although reliability is not likely

Table 8

Correlations of Item Regressed Gain with Composite Regressed Gain for Kindergarten[1]

Item	No.of Items	Simple-Concrete	Skill	Complex-Abstract
Caldwell-Soule Preschool Inventory				
1. Social Responsiveness	10	.17	.15	.23
2. Associate Vocabulary	2	.12	.06	.16
3. Concept Activation-Sensory	8	.21	.01	.44*
4. Concept Activation-Numeric	9	.22	.19	.51*
Lee-Clark Reading Readiness				
5. Letter Cross-out	5	.29	.11	.55*
6. Matching Letters and Words	9	.40	.26	.68*
NYU Early Childhood Inventory				
7. Alphabet	12	.78*	.11	.41*
8. Numerals	9	.66*	.22	.71*
Wide Range Achievement Tests				
9. Copying Marks	18	.26	.25	.31
10. Matching Letters	10	.23	.10	.14
11. Naming Letters	13	.84*	.12	.34
12. Spelling from Dictation	8	.09	.77*	.15
13. Counting Dots	8	.23	.14	.29
14. Oral Numbers	5	.55*	.33	.60*
15. Showing Fingers	2	.36	.29*	.48*
16. Which is More?	2	.14	.42*	.19
17. Solving Oral Problems	3	.12	.44*	.09
18. Written Computation	4	.15	.69*	.14
19. Word Reading Aloud	14	.11	.89*	.18
20. Name Spelling	2	.35	.13	.32
21. Recognizing Two Letters	2	.52*	.13	.29

[1]N = 1000.

*Items included in the factor score.

Table 9

Correlations of Item Regressed Gain with Composite Regressed Gain for Nonentering First Grade[1]

Item	No.of Items	Group			Individual		
		Simple-Concrete	Skill	Complex-Abstract	Simple-Concrete	Skill	Complex-Abstract
Metropolitan Readiness-Group							
1. Word Meaning	7	.13	.16	.56*	.04	.15	.17
2. Listening	6	.11	.14	.13	.05	.14	.10
3. Matching	5	.14	.26	.69*	.05	.27	.18
4. Alphabet	5	.75*	.33	.20	.41	.26	.18
5. Numbers	10	.36	.83*	.24	.21	.31	.27
6. Copying	7	.12	.17	.63*	.12	.17	.14
Sponsor Items-Group							
7. Categorization	4	.13	.21	.12	.05	.18	.14
8. Picture Sequence	1	.09	.13	.06	.02	.12	.08
9. Order of Alphabet	4	.70*	.31	.19	.31	.21	.25
10. Picture Sound	2	.18	.25	.20	.05	.29	.26
11. Count and Write	2	.48*	.24	.15	.21	.19	.09
12. Make Sides Equal	2	.05	.45*	.19	-.08	.28	.14
13. Number-line Drawing	2	.13	.47	.16	.01	.22	.18
14. Adding-Balancing Equations	2	.32	.58*	.25	.16	.43	.27
Sponsor Items-Individual							
15. Hidden Figures (cone)	5	.07	.10	.08	.04	.14	.68*
16. Word Reading	8	.14	.25	.24	.07	.73*	.28
17. Numeral Reading	10	.27	.37	.22	.18	.67*	.28
18. Verbal Opposites	2	.13	.10	.11	.13	.12	.42*
19. Similarities	2	.01	.10	.14	.05	.20	.47*
20. Absurdities	1	.00	.06	.08	.03	.11	.36*
21. Days of the Week	7	.11	.14	.11	.10	.22	.16
22. Add and Subtract	4	.18	.32	.23	.12	.42*	.38
Wide Range Achievement Test							
23. Copying Marks	18	.14	.10	.21	.10	.20	.13
24. Naming 13 Letters	13	.43	.12	.09	.97*	.05	.12
25. Spelling from Dictation	14	.19	.30	.26	.10	.80*	.28
26. Counting Dots	8	.15	.11	.10	.16	.11	.10
27. Oral Numbers	5	.27	.25	.15	.41*	.35	.18
28. Showing Fingers	2	.21	.23	.15	.23	.21	.18
29. Which is More?	2	.14	.23	.11	.14	.31*	.17
30. Solving Oral Problems	3	.24	.33	.18	.17	.31	.62*
31. Written Computation	8	.27	.41	.26	.15	.60*	.39
32. Word Reading Aloud	25	.11	.27	.24	.00	.87*	.26
33. Name Spelling	2	.10	.09	.08	.10	.02	.04
34 Recognizing Two Letters	2	.18	.01	.05	.46	-.08	.10

[1]N = 1008. *Items included in the composite score.

Table 10
Correlations Between Composites for Nonentering First Grade[1]

	Composite	Group			Individual		
		Simple-Concrete	Skill	Complex-Abstract	Simple-Concrete	Skill	Complex-Abstract
Group							
	Concrete	--					
	Skill	.37	--				
	Abstract	.18	.26	--			
Individual							
	Concrete	.45	.16	.11	--		
	Skill	.23	.39	.26	.12	--	
	Abstract	.17	.26	.19	.15	.32	--

[1]N = 1008

to be high, since gain measures are involved). Rather, it seems probable that mode of administration is an important influence on results, especially for the Abstract measures. Perhaps one reason for this may be that some teachers (or programs) may, to a greater degree than others, stress the pupil's continuing to work without close adult supervision, so that the pupils continue with an abstract task on their own. It seems reasonable that such a difference might appear more clearly with a complex-abstract task than with a simpler more concrete one. Another possibility may be that children with some teachers (or programs) are accustomed to a close-working relationship with adults, and respond more readily in an individual test situation.

Entering First and Second Grade Composites - Since both of these batteries were new the third project year, new composites were created for both. Both factor analysis and item analysis against a priori composites were employed in creating the composites. The items which entered each composite are shown in Tables 10a and 10b.

Problems in the regressed gain composites - After these composites had been created and related to process measures, both for kindergarten and nonentering first grade, unexpected scores were discovered. Specifically, several negative regressed gain scores were found, despite the fact that a constant of 50 had been built into the regressed gain scoring program in order to eliminate negative values. Careful rechecking of the computation showed that the calculations had been correct. Instead, the negative regressed gain scores were found to be a consequence of a few pupils having made materially higher scores on pretest than posttest. In the course of further checking, it was found that the adjustment being made to individual scores at the two extremes of the distribution was not what would have been expected. In order to clarify this, scatter plots of the relationship between pretest score and raw gain were tabulated for each composite. Some of these plots suggested nonlinearity of the relationship, so curves were fitted to the data, and the deviation

Table 10a

Items Combined into Subscores for Entering First Grade

Complex-Abstract

Group	Individual
LC[1] Matching Letters and words	PSI[3] Social Responsiveness
MRT[2] Matching	Assoc. Vocabulary
Copying	Concept Act. Sensory
	Concept Act. Numeric

Skill	Simple-Concrete
SIG[4] Order of Alphabet	ECI[6] Alphabet
WRAT[5] Spelling from Dictation	Numerals
Solving Problems	SIG Count and Write Numbers
Written Computation	WRAT Naming Letters
Word Reading Aloud	Counting 15 Dots
MRT Numbers	Recognizing 2 Letters
	MRT Alphabet

1. LC - Lee-Clark Reading Readiness (Group)
2. MRT - Metropolitan Readiness Test (Group)
3. PSI - Preschool Inventory (Individual)
4. SIG - Sponsor Item (Group)
5. WRAT - Wide Range Achievement Test (Individual)
6. ECI - Early Childhood Inventory (Group)

Table 10b

Items Combined into Subscores for Second Grade

Complex-Abstract	Skill	Simple-Concrete
	Group	
MRT[1] Word Meaning	MRT Numbers	
Matching	SAT[2] Word Reading 1-10	
	Word Reading 11-20	
	MAT[3] Arithmetic Comp.	
	Individual	
SII[4] Opposites	SII Word & Phrase Read.	SII Days of Week
Verbal Opposites	Reading Sounds	WRAT Naming 13
Similarities	Story Reading	letters
Absurdities	Comprehension	
	Reading Numerals	
	WRAT[5] Spelling	
	Which is more	
	Written Computation	
	Word Reading Aloud	

1. MRT - Metropolitan Readiness Test
2. SAT - Stanford Achievement Test
3. MAT - Metropolitan Achievement Test
4. SII - Sponsor Items, Individual
5. WRAT - Wide Range Achievement Test

from linearity was tested using the polynomial regression program (05R) from the Biomedical Computer Program library (Dixon, 1970).

It should be noted that the output from this program puts the Y variable (Gain) on the horizontal axis, and the X variable (Pretest) on the vertical axis. The table can be read by making the side the base, but then the base scale is reversed. The letters printed in the figure are "O's" for observed values, "P's" for predicted values (the curve fitted to the data), and "B's" for predicted values which coincide with observed values.

Kindergarten plots - The plots for pretest Concrete and Abstract composites with gain show a common pattern (Tables 11 and 12). There is a pronounced ceiling effect, in which pupils with high pretest scores cluster closely along the diagonal, with both gain and variability sharply restricted. The regression slope is downward, so that the higher the pretest, the lower the gain, but the sharp cutoff along the diagonal suggests some ceiling effect along most of the pretest range. The two plots show a wide scattering away from the diagonal for low pretest pupils which is not true for pupils even at a middle level, suggesting that some of these pupils grow very little, even when there is a wide range of points available to them on the test. The product moment correlation for Concrete was -.64; for Abstract -.61. The plot for Skill is presented in Table 13; the correlation was +.12.

The Concrete and Abstract data illustrate a critical problem in the evaluation of Follow Through. The classroom (or sponsor) who happened to have a high proportion of pupils with high pretest scores would have a material disadvantage in showing pupil gain. But the classroom (or sponsor) who worked with pupils scoring below or at the middle level, would have a material advantage. A linear regressed gain, or covariance adjustment, would result in an especially great handicap for high pretest pupils.

Pretest scores on the Skill measure (Table 13) are surprisingly homogeneous with only one percent of pupils scoring over five. This contrasts with the Abstract and Concrete measures, in which there is wide variability in pretest score, and points up the uniqueness of the Skill measure. Apparently pupils from a variety of backgrounds arrive at kindergarten at very similar levels on this measure.

The major problem in the kindergarten gain data seems to be that a major portion of the items in the battery show the difficulties in evaluating classrooms and sponsors outlined above; namely, ceiling effect and nonlinearity of relation between pretest and gain. As a consequence, any way of combining items would be likely to show these difficulties.

In order to minimize the ceiling effect, pupils were eliminated who could show little gain. High prescoring pupils were eliminated for each composite separately. For the skill measure, the stragglers who separated from the major grouping were eliminated. For the Concrete and Abstract measures, the high pretest "tail" of the plot was eliminated so that the major effect of the ceiling was minimized. In addition, regressed gain was calculated as deviations from a curve fitted to the data in all three cases, although the deviation from linearity was slight for the Skill measure after the extreme pretest scores had been eliminated.

Table 11 - Concrete Scores for Kindergarten

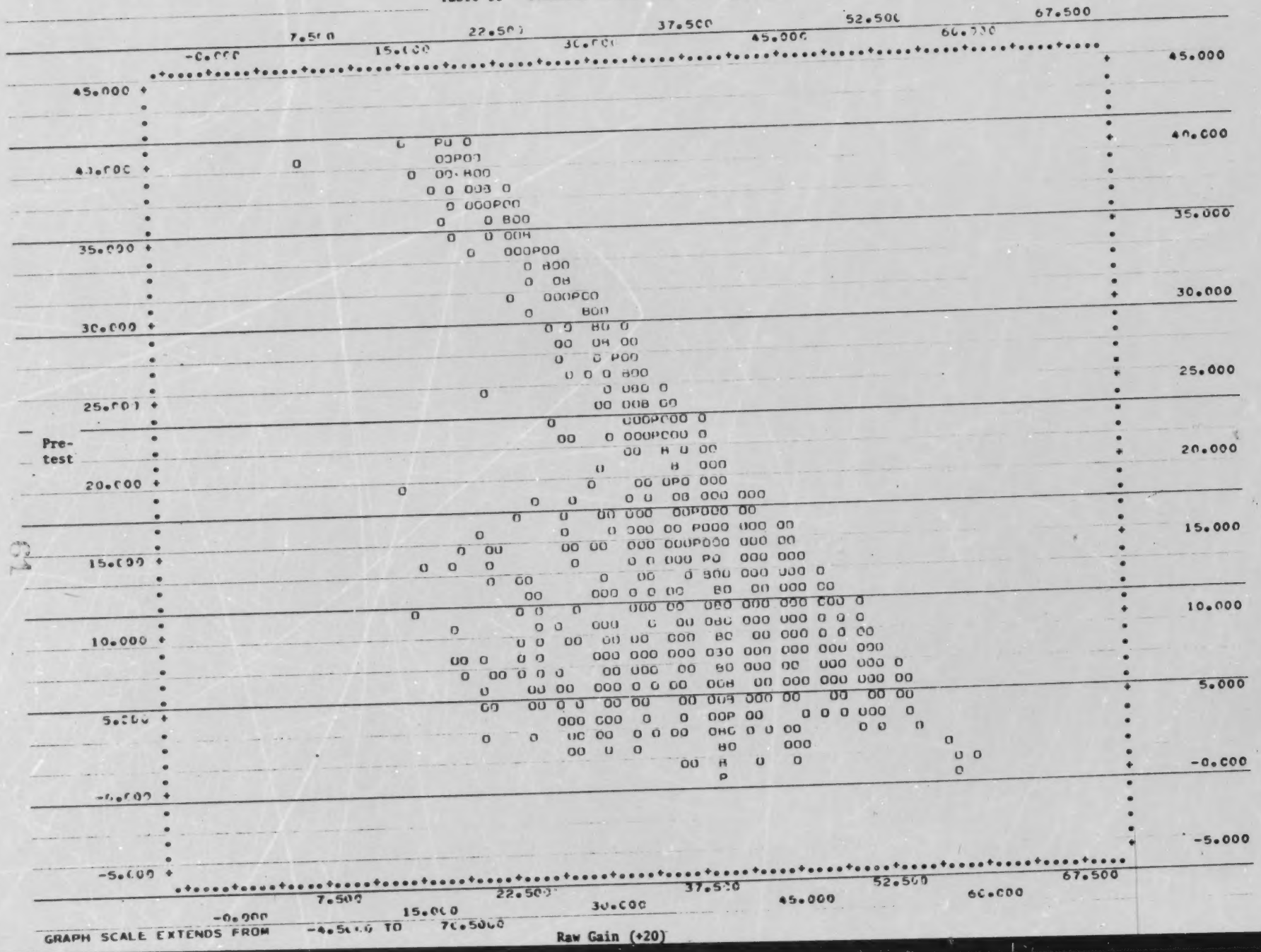


Table 12 - Abstract Scores for Kindergarten

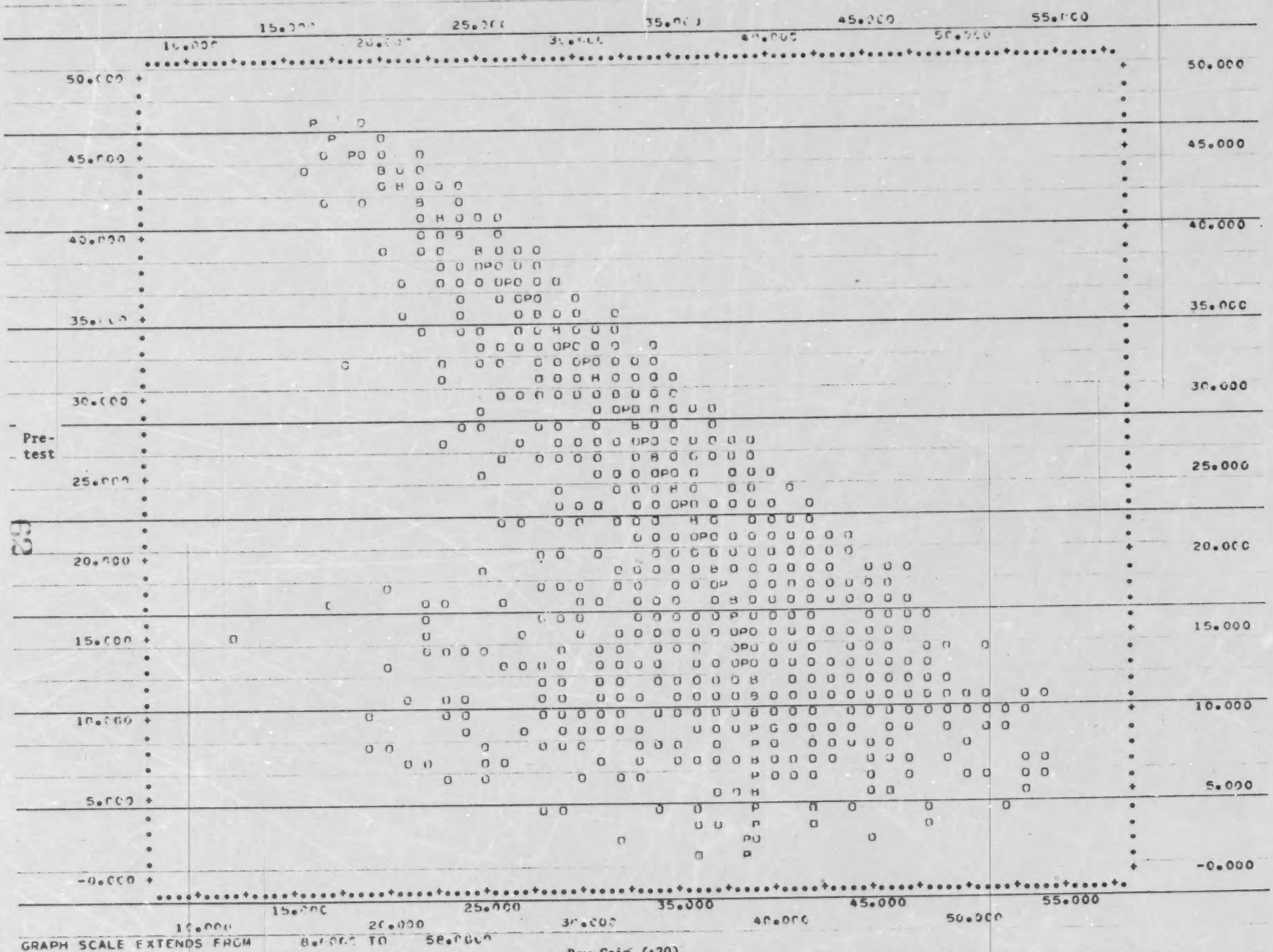


Table 13 - Skill Scores for Kindergarten

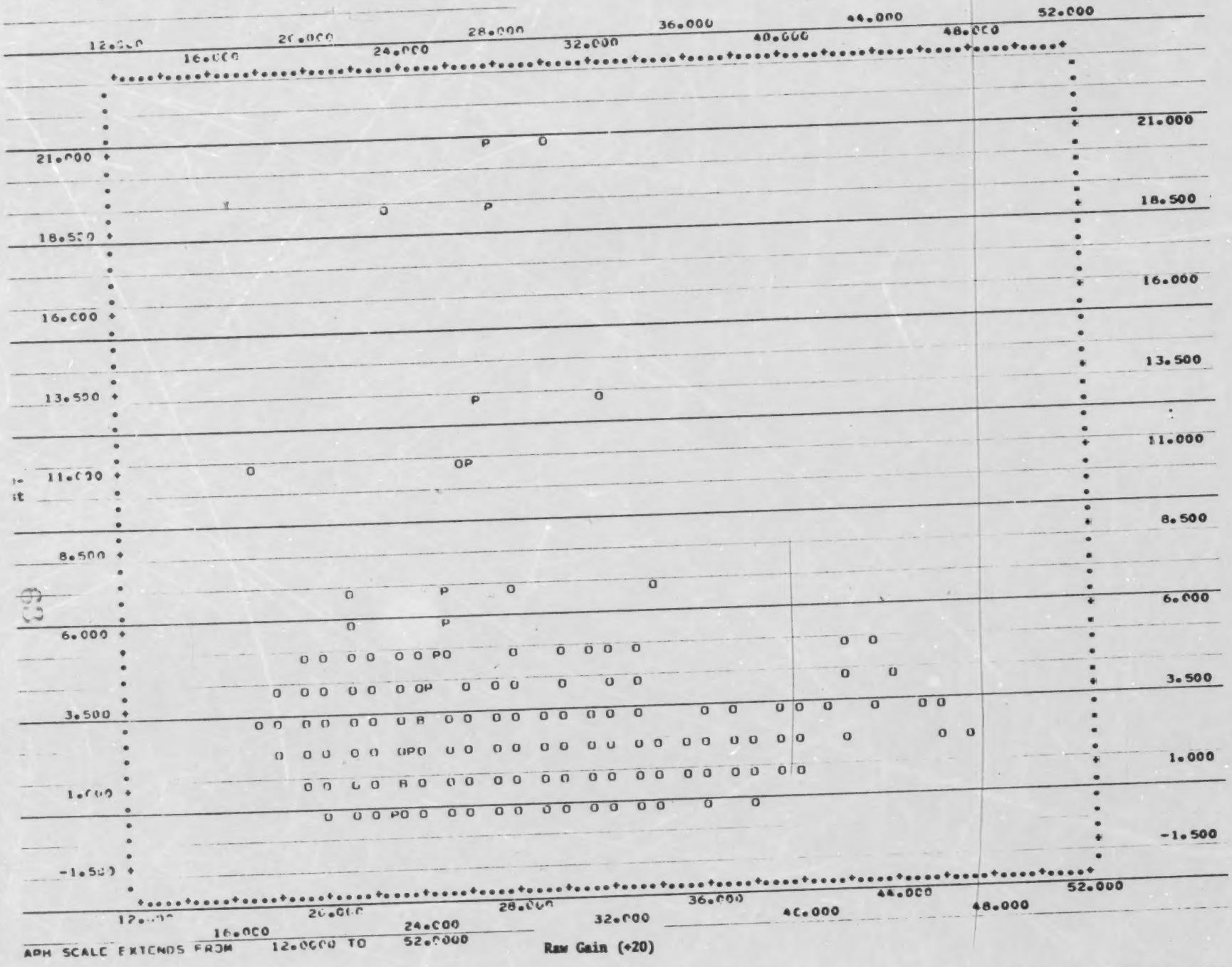


Table 14

Number of Pupils and Classrooms for Reanalysis of Three Composites for Kindergarten

Subgroup	Orig. N	Concrete Drop	Concrete New N	Skill Drop	Skill New N	Abstract Drop	Abstract New N
Nonwhite - Low	715	142	573	3	712	21	694
White - Low	91	25	66	0	91	1	90
Nonwhite - High	56	10	46	0	56	2	54
White - High	138	85	53	6	132	20	118
N =	1000	262	738	9	991	44	956
Cutoff Score		24+		6+		40+	
Classrooms	57	57		57		57	
Classrooms dropped because of small N		8		3		3	
Number of classes for reanalysis		49		54		54	

Table 14 shows the cutting points used, the numbers of pupils dropped, and the number of classrooms dropped as a consequence of the reduced pupil N.

Nonentering first grade plots - The plots for all of the group measures (Tables 15, 16, and 17), and Individual Abstract (Table 18), all seemed reasonably linear (excluding high pretest scores), and a linear regressed gain procedure was applied after dropping high pretest scores. The correlations between pretest and gain were as follows: Group Concrete -.42; Group Skill -.33; Group Abstract -.44, and Individual Abstract -.43. The Individual Concrete (r = -.69) and Individual Skill measures (r = .29) in Tables 19 and 20, showed patterns in one way similar to kindergarten Concrete and Abstract, however. The same reduced gain for high pretest pupils with associated nonlinearity was present. An additional problem appeared for Individual Skill as well. Low scoring pupils also showed lower gain, on the average, than pupils scoring toward the middle of the pretest scale. On this measure, then, classrooms (or sponsors) who had a higher than average proportion of pupils scoring toward the middle of the pretest scale would have a material advantage in comparison with classrooms (or sponsors) with higher proportions of either high or low scoring pupils.

Table 15

Group Concrete Scores for Nonentering First Grades

Raw Gain (+20)												Row Total
32	*											0
31	*	9										9
30	*	4	11									15
29	*	6	15	20								41
28	*	8	13	11	10							42
27	*	9	5	14	20	34						82
26	*	12	19	10	13	26	25					105
25	*	16	20	31	8	12	23	30				140
24	*	11	10	16	26	16	9	20	86			194
23	*	19	5	13	11	13	7	10	36	30		144
22	*	7	6	12	7	6	15	11	17	13	32	126
21	*	8	5	4		3	7	3	8	6	9	53
20	*	8	3	4	2	1	1	4	5	1	3	32
19	*		6	1		2	1	2	4	1		17
18	*			1	1	1	1		1		1	6
17	*				1							1
16	*								1			1
15	*											0
14	*											0
13	*											0
12	*											0
11	*											0
10	*											0
		0		2		4		6		8	10	
(1)			1		3		5		7		9	
COLUMN TOTAL		117	118	137	99	114	89	80	158	51	45	0

GRAND TOTAL= 1008

Pretest

Table 16

Group Skill for Nonentering First Grades

Raw Gain (+20)																				Row Total
	36 *																			0
	35 *																			0
	34 *	1	1																	2
	33 *		2	1																3
	32 *	1	4	2		1														8
	31 *	4	3	4	2	1														14
	30 *	4	5	8	6	5	3													31
	29 *		7	5	8	5	8	5	2											40
	28 *	3	7	16	15	11	14	10	7											83
	27 *	3	9	13	17	16	15	11	10	6	5									105
	26 *	4	8	9	12	14	19	7	14	9	6									102
	25 *	6	12	11	15	11	17	13	13	11	8	7	2							126
	24 *	6	14	14	23	14	10	11	10	5	4	9	5	5						130
	23 *	3	12	10	12	9	10	7	8	5	11	11	10	4	2					114
	22 *	1	8	9	7	12	1	3	6	4	3	9	6	7	3	1				80
	21 *	3	10	8	11	6	4	3	2	6	5	5	6	6	4	3	1			83
	20 *	1	1	5	5	1	5	3			3	3	2	2	3	3		1		38
	19 *		2	6	7	2	1		3				2	3		1				27
	18 *			2	1	3	2		1	1		1					1			12
	17 *					1	1	1	2				2				1			8
	16 *						1			1										2
	15 *																			0
	14 *																			0
	13 *																			0
	12 *																			0
	11 *																			0
	10 *																			0
	9 *																			0
	8 *																			0
	7 *																			0
	6 *																			0
	5 *																			0
	4 *																			0
	3 *																			0
	2 *																			0
	1 *																			0
	(11)	1		3		5		7		9		11		13		15		17		19
	Group Skill Pretest (+1)		2		4		6		8		10		12		14		16		18	20
	COLUMN	40		123		112		74		48		45		27		8		1		0
	TOTAL	105		141		111		78		45		35		12		3		0		0

GRAND TOTAL= 1008

Table 17

Group Abstract for Nonentering First Grades

Raw Gain (+20)																						Row Total
	39	*																				0
	38	*																				0
	37	*																				0
	36	*																				0
	35	*																				0
	34	*																				0
	33	*																				0
	32	*			2																	2
	31	*	2	4		1	2															9
	30	*		2	1		1		1	1												6
	29	*		3		3	3	1	1	1	1											13
	28	*	3	5	8	2	3	3	5	5	2	1										37
	27	*	1	8	6	11	5	4	2		1		1		1							40
	26	*	1	7	13	14	8	9	1	6	2	1	1	1	1							65
	25	*	1	8	11	18	12	11	17	5	6	9	4	6	1							109
	24	*	2	10	12	14	14	15	17	8	10	6	7	6	4							125
	23	*	1	6	10	16	8	13	7	17	7	8	5	5	3	1	4		1			112
	22	*	5	7	10	11	12	9	11	9	12	10	7	6	9	3	1	1	2			125
	21	*	2	4	10	11	7	4	11	11	11	13	12	6	7	5	3		1		1	119
	20	*	1	6	5	6	3	8	6	11	5	5	10	10	10	4	1		1			92
	19	*			2	3	9	7	6	6	8	6	5		5	3		2	3	1		66
	18	*			1	3	1	5	2	2	2	8	3	3		2	3	3	1		1	40
	17	*				1	2	1	1	1	4	2	1	3	1		1	2				20
	16	*					1	1		1	3	1	1		3	4	1	2		1		19
	15	*						1			1	1		1	1	1				1		7
	14	*													1							1
	13	*													1							1
	12	*																				0
	11	*																				0
	10	*																				0
	9	*																				0
	8	*																				0
	7	*																				0
	6	*																				0
	5	*																				0
	4	*																				0
	3	*																				0
	2	*																				0
	1	*																				0
	(12)		1		3		5		7		9		11		13		15		17		19	
	Group Abst.		2		4		6		8		10		12		14		16		18		20	
	Pretest (+1)																					
	COLUMN TOTAL		19	70	91	114	91	92	88	84	75	71	57	47	48	23	14	10	9	3	2	0

GRAND TOTAL= 1008

Table 18

Individual Abstract for Nonentering First Grades

Raw Gain (+20)														Row Total
	33 *													0
	32 *													0
	31 *													0
	30 *													0
	29 *	2	1											3
	28 *		2	6	2									10
	27 *	2	4	5	6	4	2	1						24
	26 *	1	4	6	13	9	4		2					39
	25 *	5	8	15	13	15	8	5	2					71
	24 *	7	12	18	27	17	22	10	8	1				122
	23 *	4	11	15	24	21	30	16	11	17	3			152
	22 *	1	13	17	23	27	38	19	14	7	7	2	1	169
	21 *	1	8	7	22	27	34	15	11	10	8	3	1	147
	20 *	1	2	9	16	15	19	19	12	8	9	1	1	112
	19 *		1	1	10	14	20	18	7	8	3	1		83
	18 *			1	2	4	9	3	7	9	8	1		44
	17 *				3	2	3	4		1	1	2	1	17
	16 *					1	2	1	1	3			2	10
	15 *							1	1		2			4
	14 *									1				1
	13 *													0
	12 *													0
	11 *													0
	10 *													0
	9 *													0
	8 *													0
	7 *													0
	6 *													0
	5 *													0
	4 *													0
	3 *													0
	2 *													0
	1 *													0
	(15)	1	3	5	7	9	11	13	15	17	19			
	Ind. Abst. Pretest (+1)	2	4	6	8	10	12	14	16	18	20			
	COLUMN TOTAL	24 / 66	100 / 161	156 / 191	112 / 76	65 / 41	10 / 6	0 / 0	0 / 0	0 / 0	0 / 0			

GRAND TOTAL = 1008

Table 19 - Individual Concrete Scores for Nonentering First

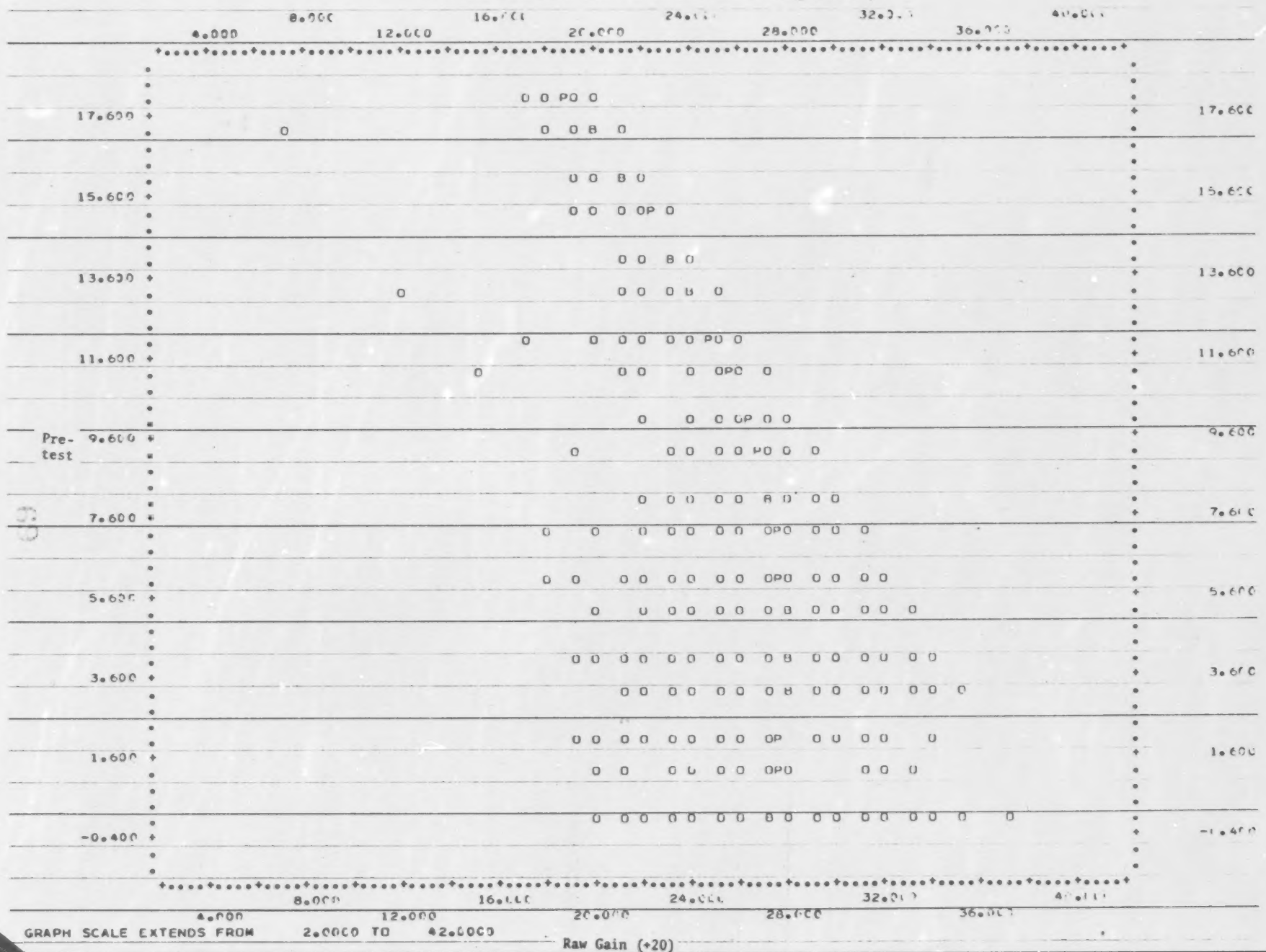
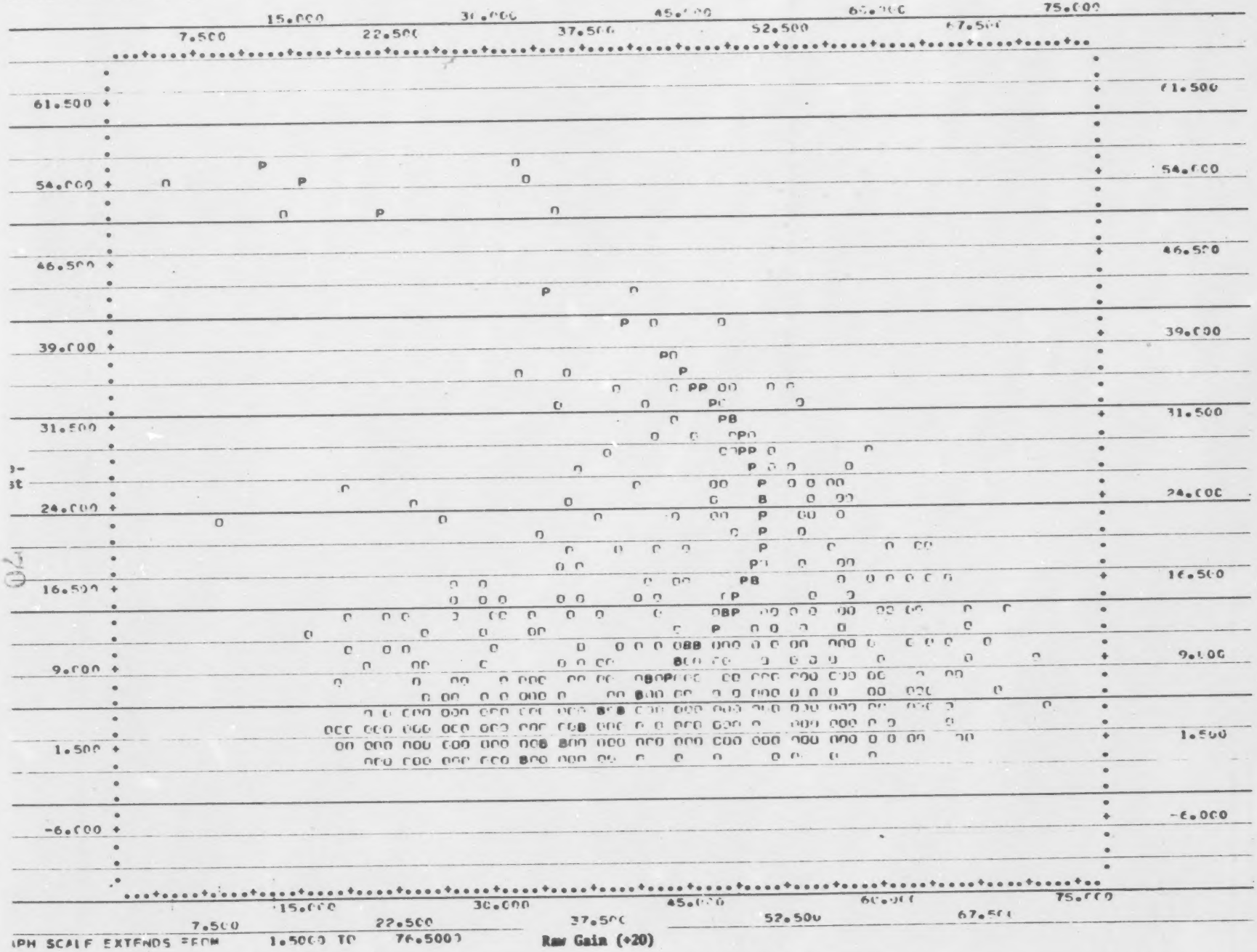


Table 20 - Continuing First Grade - Individual Skill



Two possible explanations for the lower gain of low prescoring pupils may be that there is a threshold effect because the items are too difficult for some of the more disadvantaged pupils, so that their performance is largely chance and little gain is shown; the other may be that some of the pupils are sufficiently disadvantaged that they are unable to learn, or learn very little. Since the learning shown is a function of both pupil growth and the items that measure it, the two cannot be disentangled. Of course, both may be true to varying degrees at the same time, and other factors may also be possible explanations.

The problem of an adequate gain score is made more severe than it would be otherwise by the fact that Individual Skill is a considerably longer subtest than any of the others. It contains 71 items, in contrast to the next longest, Group Abstract, which contains 19 items. The correlations between the Concrete, Skill, and Abstract composites at the continuing first level show that these measures are relatively independent. The large number of skill items present in the battery means that learning objectives of the sort this scale represents will be heavily weighted, however the items are combined into scores. In a battery total, for instance, the Group and Individual Skills items would be 87 of the 200 possible points. If the scores were broken up by subject matter area (arithmetic, reading, etc.), each of these subtests would be likely to be heavily weighted with skill-type activities. It seems likely that sponsors who stress more complex objectives would be penalized by such procedures.

The differing patterns shown by the plots, and the low correlations between the various composites, as well as the large number of skill items, all appear to argue for the use of composites such as these, so that the effect of teaching on the differing levels of complexity of learning can be separately assessed.

As with kindergarten, higher pretest scores were dropped, and the data reanalyzed, using nonlinear regressed gain for the Individual Skill and Concrete measures. Data on pupils and classrooms dropped are shown in Table 21.

It should be noted that this is the second stage of attrition by which high scoring pupils have been eliminated. The first was the elimination of pupils who scored higher than average on pretest measures for missing SES data. The second was the specific elimination of high prescoring pupils because their gain could not be adequately represented. Further analyses of pupil growth in this report will best represent low and moderate achieving pupils, rather than the entire range present in Follow Through.

Entering First and Second Grade Composites - These data present no problems. The scatter plots showed approximately normal distributions, with no evidence of ceiling effect or threshold effect. There was a slight suggestion of nonlinearity for the total group in each case, but when subgroups of white, nonwhite, advantaged and disadvantaged were separated from each other, the nonlinearity disappeared, but differences in regression were evident from subgroup to subgroup. Regressed gain was calculated separately for each subgroup as a consequence.

Table 21

Number of Pupils and Classrooms for Reanalysis of Six Composites for Nonentering First

Subgroup	Orig. N	Group Concrete, Skill, Abstract		Individual Concrete		Individual Skill		Individual Abstract	
		Drop	New N	Drop	New N	Drop	New N	Drop	New N
Nonwhite - Low	699	104	595	226	473	23	676	104	595
White - Low	93	19	74	33	60	1	92	19	74
Nonwhite - High	129	11	118	35	94	0	129	11	118
White - High	87	43	44	44	43	6	81	43	44
	1008	177	831	338	670	30	978	177	831
Cutoff Score		8+, 12+, 13+*		14+		29+		9+	
Classrooms	53		53		53		53		53
Classrooms dropped because of small N			3		6		3		3
Number of classes for reanalysis			50		47		50		50

*In the order of the heading

Implications - The problems that were encountered in calculating pupil gain have been exceedingly difficult and validate Bereiter's comment cited earlier. Presumably, his comment was made expecting that the assumptions for analyses would be met, and that has not been the case with numbers of these sets of data so that the problems are even greater.

The main problem is with estimating gain for high prescoring pupils. If raw gain is used, numbers of these pupils cannot reach even mean gain for the total group. If a linear regressed gain (or covariance) is applied, then high scoring pupils as a group will fall below the regression line. In this study, the extreme example was Individual Skill for continuing first grade where the largest number of pupils falls at the low end of the prescore scale, so that the correlation of pretest and gain is positive, and the regression line has a positive slope (as conventionally conceived). In this case, the fit of a straight line is disastrous for high scoring pupils. As an extreme example, when a curve was fitted, the regressed gain score of a high scoring pupil increased by more than 40 points. There can be little question that the latter scores better represent the achievement of these pupils.

Probably the estimation of gain for these data has no proper solution. While it seems probable that eliminating high prescoring pupils and fitting curves to the data have improved on other common analyses, it is still true that the results are less than ideal, and probably do not represent well the attainment of all pupils throughout the pretest range which has been retained.

The measurement of gain is a difficult problem in educational evaluation in general. The problems are particularly difficult in this case and the limitations of these gain measures must also qualify the conclusions drawn from subsequent analyses in which these data are used as criterion measures. We cannot be sure what classroom behaviors promote the growth of pupils if we cannot be sure which pupils grow more than others.

Attitude Change Composite - All Grades - Attitude data from SRI were available for 169 classrooms. Since preliminary analyses suggested differences between advantaged and disadvantaged and white and nonwhite subgroups, data were screened out which lacked these classifications, leaving 165 classrooms.

Factor analysis of the pretest items produced lower loadings overall than analysis of the achievement items had, suggesting lower reliability for this group of items. Accordingly, composites were created on the basis of the analysis of pretest items for both pre- and post data, and the composites then reduced to regressed gain, and classroom means calculated.

As shown in Table 21a, a first factor was obtained which was quite stable across grade level groups. Additional factors were not stable across grade levels, were not often interpretable, and usually were made up of small numbers of items. The first factor, then, was used to represent attitudes toward school at all grade levels.

Table 21a

Factor Loadings for Attitude Data

Item	Grade Level: Kindergarten	Entering First	Nonentering First	Second
Put a mark on the face that shows how you feel/think...				
1. when you eat ice cream.			.45	
2. when you fall down on the playground.				
3. about learning out of books.	.58	.44	.47	.43
4. when you think about coming to school in the morning.	.64	.55	.46	.49
5. about the boys and girls in school.	.56	.41	.52	.42
6. about learning new things.	.71	.66	.52	.40
7. the boys and girls in this class feel about you.	.66	.47	.52	.47
8. the teacher feels about you.	.70	.49	.57	.44
9. feel about your teacher.	.67	.56	.61	.49
In this box is your teacher, and in this box are your friends,				
10. put a mark where you want to be.				
Here is your teacher and here are five empty circles,				
11. put a mark on the empty circle where you want to be.				
Here are your friends and here are five empty circles,				
12. put a mark on the empty circle where you want to be.				

Results: The Classroom Observation Measures

The four observation instruments had over 400 items and measures of behavior altogether. Medley and Mitzel (1963) point out that single items typically do not have high reliability, but that reliability increases rapidly as items are pooled. Since many of the items could be assumed to overlap with each other, factor analysis was used as a way of combining items, and of identifying clusters of behavior that tended to occur together, and independently of other clusters. As indicated in the procedure section, items with loadings of $\pm$ .40 or greater were combined into incomplete factor scores by summing algebraically, with equal weighting. These factor scores were then used to test for differences between programs using the multiple range test (Dixon, 1970), and are reported in Appendix E. The same measures were also related to measures of classroom mean gain.

Florida Climate and Control System (FLACCS)

As indicated in the procedure section, the factor analysis of FLACCS was a three-stage process, with the control section and the affect section each being factored separately, then with the items or groups of items that loaded most heavily in those two preliminary analyses assembled for a joint analysis. The nine factors presented below are from that joint analysis.

Factor 1 - Strong Control

This is a factor which represents strong controlling behavior, and it is a strong factor as well, in that it has the highest eigenvalue of any, indicating that it represents more of the variance between classrooms than any of the other factors (Table 22). The factor represents the teacher managing the classroom by the use of coercive control methods and negative affect. The highest loading is for Total teacher negative affect, followed closely by the two strongest levels of verbal control. These levels include such items as Using a firm or sharp tone, Scolding, Punishing, Ordering or commanding, Criticising, Supervising pupils closely or immobilizing them, and Warning. The rest of the teacher items in the factor are either items from those sets, or ones which parallel it.

The pupil behavior primarily reflects resistance to the teacher behavior. The item Pupil engages in out-of-bounds behavior represents behavior which the observer perceives as exceeding the limits set by the teacher. The teacher's behavior seems to make clear that she sees the classroom as out-of-bounds and is attempting to deal with it. The other pupil items, all negative, are covert rather than overt: Shows apathy; Makes face, frowns, Pouts, withdraws, Uncooperative, resistant -- all appear to reflect passive or apathetic response to the teacher rather than active negative behaviors such as hitting, finding fault, pushing or pulling.

Table 22

Florida Climate and Control System

Factor 1 - Strong Control

Item	Loading	Description
11	.71	Teacher warns
12	.73	Teacher criticizes
13	.70	T orders, commands
18	.53	T holds, pushes, spanks (harsh)
19	.51	T says, "Shhh!" Shakes head
20	.77	T glares, frowns
26	.56	Pupil resists, disobeys directions
32	.46	P engages in out-of-bounds behavior
39	.41	P shows apathy
50	.62	Level 3, T verbal control
51	.82	Level 4, T verbal control
52	.87	Level 5, T verbal control
55	.50	Level 3, T nonverbal control
56	.70	T says "Stop it," etc.
57	.78	T uses threatening tone
58	.73	T criticizes, blames
69	.74	T frowns
70	.68	T points, shakes finger
71	.45	P makes face, frowns
72	.61	P uncooperative, resistant
82	.89	Total T negative
83	.52	Total P negative
1	-.42	Pupil Interest Attention

Eigenvalue = 11.69

Factor 2 - Pupil Free Choice vs No Choice

It seems clear that the major thread which this factor represents is the degree of freedom the pupil has to choose what he wants to do (Table 23). The highest loading in the factor is in the negative pole which reflects no choice on the pupil's part, accompanied with the teacher being "front and center," directing without reason, and permitting little socialization. The positive pole of the factor, on the other hand, represents pupil free choice, free work groups, frequent socialization, and the expression of positive affect. Pupil limited choice also loads highly -- an item which reflects pupil having choice either in what he is to do or how he is to do it, but not both. The item Teacher attends pupil closely represents the teacher responding to a need expressed by a pupil, so appears to be consonant with the remainder of the factor.

The item Pupil uses play object as itself suggests that the positive pole of the factor may represent a free-play situation rather than a "teaching" situation, and it may be that the factor represents, to some degree, the difference between formal task activity and free play. In any case, the pupil freedom of choice dimension appears to be central.

Factor 3 - Teacher-Pupil Supportive Behavior

This factor (Table 24) appears to be the obverse of the first factor, Strong Control, in a number of ways. It is characterized by both teacher and pupil positive affect items such as Teacher supports child and Pupil agrees with another, Pupil helpful, shares, Pupil leans close to another; but there are also aspects of teacher control and task orientation as well. Teacher correction without criticism would occur only in a subject matter setting, and Level one, Teacher verbal control, represents teacher management behavior of a gentle, noncoercive sort.

Factor 4 - Nonverbal Gentle Control

This factor seems to represent teacher control by the use of the hands, rather than by verbal means or facial or bodily responses (Table 25). It is interesting that the most gentle items of nonverbal control (Nods, smiles, Positive facial feedback, "Body English,") are not represented in the factor. It may be that teachers exercise gentle control either with their hands, or with their faces.

Factor 5 - Gentle Control

The division of items between this factor (Table 26) and the preceding one is intriguing. Both represent gentle control, but the previous factor represents use of the hands, whereas this one represents gentle verbal control, apparently primarily by the use of questions, along with nods and smiles for control.

Table 23

Florida Climate and Control System

Factor 2 - Pupil Free Choice vs No Choice

Item	Loading	Description
3	.41	T attends p closely
22	.62	Pupil limited choice
23	.60	Pupil free choice
33	.56	Task related movement
34	.63	P uses play object as itself
36	.59	P works, plays collaboratively
42	.67	Free work groups
44	.59	Frequent socialization
81	.43	P pats, hugs another
85	.50	Total p positive
2	-.65	Teacher central
10	-.54	T directs without reason
21	-.80	Pupil no choice
43	-.49	Almost no socialization

Eigenvalue = 6.95

Table 24

Florida Climate and Control System

Factor 3 - Teacher-Pupil Supportive Behavior

Item	Loading	Description
5	.58	T suggests, guides
7	.43	T corrects without criticism (SM)
37	.59	P seeks reassurance, support
38	.57	P shows pride
18	.44	Level 1, T verbal control
62	.68	T supports child
67	.65	P agrees with another
77	.65	T waits for child (positive)
79	.55	P helpful, shares
80	.57	P leans close to another
85	.41	Total P positive

Eigenvalue = 5.73

Table 25

Florida Climate and Control System

Factor 4 - Nonverbal Gentle Control

Item	Loading	Description
16	.64	T gestures
17	.47	T touches, pats, (gentle)
54	.65	Level 2, T nonverbal control
29	-.48	P gives information

Eigenvalue = 3.04

Table 26

Florida Climate and Control System

Factor 5 - Gentle Control

Item	Loading	Description
6	.44	T questions for reflective thought
8	.65	T questions for control
14	.68	T nods, smiles for control
15	.54	T positive facial feedback
49	.65	Level 2, T verbal control
53	.70	Level 1, T nonverbal control

Eigenvale = 3.44

Factor 6 - Work Without the Teacher

The items in the factor (Table 27) appear to represent the pupil being structured into seatwork or a group without the teacher. The pupil working or playing without interaction with anyone else (parallel work or play), may be related to the seatwork item, but the essential element of the factor seems to be "without the teacher."

Factor 7 - Pupil Negative Affect

This is a factor made up entirely of items of pupil controlling behavior and negative affect (Table 28). The highest loading is for the total of all pupil negative affect behaviors. In contrast to Factor 1 in which strong teacher control and negative affect predominated, with covert pupil negative affect, this factor represents active pupil negative behavior, apparently in the absence of teacher control. The higher loading items, Takes , Damages property, Teases, Threatens, Picks at child, and Commands or demands, appear to identify the tone of the entire factor.

Factor 8 - Teacher Attention in a Task Setting

The highest loading item, Teacher closeness of attention, is a summary score for the teacher's overall position on several items which reflect varying degrees of attention to individual pupils, in contrast to dealing with the class as a whole or as large groups (Table 29). Teacher attends pupil closely, which also loads heavily, represents the closest degree of attention to an individual pupil which is recorded, in which the teacher attention is directed at meeting some need of the pupil. Two other items represent closeness of supervision by the teacher, which apparently involves working with individual pupils, and pupils structured into individual activities. The item Materials structure pupil behavior apparently completes a context in which pupils work individually, are supervised closely, and work with materials which assist in structuring their behavior. Apparently the major element of the factor is individual attention from the teacher, but this tends to occur in a task setting.

Factor 9 - Teacher Positive Affect

This factor (Table 30) reflects primarily positive affect on the teacher's part, although positive pupil behavior enters to a considerable degree as well. This factor has an active, outgoing positive affective element on the part of the teacher, whereas Factor 3 presented a more subtle, passive teacher responding role. There is some indication that this factor is task-oriented because of the occurrence of the item Pupil obeys directions. Perhaps an alternative title would be teacher "bubbly" behavior.

Table 27

Florida Climate and Control System

Factor 6 - Work Without Teacher

Item	Loading	Description
24	.58	P seatwork without teacher
35	.41	Parallel work or play
41	.62	Structured groups without teacher

Eigenvalue = 2.63

Table 28

Florida Climate and Control System

Factor 7 - Pupil Negative Affect

Item	Loading	Description
30	.43	P gives directions
32	.63	P engages in out-of-bounds behavior
59	.70	P teases
60	.65	P commands or demands
61	.69	P threatens
71	.43	P makes face, frowns
72	.48	P uncooperative, resistant
73	.57	P interferes, threatens
74	.70	P takes, damages property
75	.66	P picks at child
76	.56	P pushes or pulls, holds
83	.75	Total P negative
43	-.41	Almost no socialization

Eigenvalue = 6.65

Table 29

Florida Climate and Control System

Factor 8 - Teacher Attention in a Task Setting

Item	Loading	Description
3	.68	T attends P closely
25	.47	P works, plays with much supervision
40	.46	Pupil as individual (work groups)
46	.43	Materials Structure P behavior
47	.77	T closeness of attention

Eigenvalue = 3.13

Table 30

Florida Climate and Control System

Factor 9 - Teacher Positive Affect

Item	Loading	Description
1	.52	Pupil interest attention rating
27	.49	P obeys directions
63	.46	T gives individual attention
64	.70	T warm, congenial
65	.67	T is enthusiastic
66	.56	P sounds friendly
68	.62	P is enthusiastic (verbal)
78	.55	T smiles, laughs, nods
84	.78	Total T positive
85	.46	Total P positive

Eigenvalue = 5.23

Intercorrelations of FLACCS factors - The intercorrelation of FLACCS factors, as well as the intercorrelations of all factors for all instruments, are shown in Table 31, sections 1-4. Since it is reduced from computer printout, its labels need some explanation. "FLX1" refers to FLACCS Factor 1, etc. TPR is TPOR, and COG refers to the Cognitive Taxonomy. The recurring label IDNO is a check on processing and should be ignored.

Again, incomplete factor scores were calculated, which permits correlation between factors, even within an instrument. Correlations across instruments represent overlap from one instrument to another. Although there are numbers of significant correlations since the N is 289, those above .50 will be given primary attention.

Only two correlations are above .50 for FLACCS -- one between Factor 1, Strong Control, and 7, Pupil Negative Affect. Factor 1 contained resistant pupil negative behavior, and Factor 7 contains the more active pupil negative affect. The other high relationship is between Factor 2, Pupil Free Choice, and Factor 9, Teacher Positive Affect. It is surprising that Factor 4, Nonverbal Gentle Control, and Factor 5, Gentle Control, are unrelated, suggesting that the teacher who uses her hands in gentle control is not the one who uses verbal gentle control with smiles and facial feedback.

Grade level differences for FLACCS - When grade level differences in behavior are examined, the nature of the sample at each grade level becomes important. Kindergarten and continuing first grade are probably better representative of sponsors, geographic regions, and rural-urban differences. Entering first grade is primarily southern and rural and represents sponsors less well. Second grade omits two sponsors completely and represents others unevenly, with the more highly structured programs less well represented.

Five of the nine factors from FLACCS showed F ratios which were significant between grade levels (Tables 32 through 40). In general, kindergarten is the grade level which deviates most often from the others, showing less Strong Control but more Pupil Free Choice, and more teacher Gentle Control. It also showed less Work Without the Teacher and less Teacher Attention in a Task Setting, which would be expected.

The position of entering first on the first two factors indicates that the absence of Strong Control does not indicate Pupil Freedom of Choice.

For convenience in using Table 31, the Intercorrelations of Factor Scores, the factor titles for all of the observation instruments, are listed in Table 102, pages 114 and 115.

Table 31
Intercorrelations of Factor Scores for Observation Instruments

		IDNO 1	FLX1 2	FLX2 3	FLX3 4	FLX4 5	FLX5 6	FLX6 7	FLX7 8	FLX8 9	FLX9 10
IDNO	1	1.00	-0.01	0.05	-0.02	-0.18	-0.19	0.08	0.06	0.10	-0.03
FLX1	2	-0.01	1.00	-0.09	0.17	0.15	-0.05	0.11	0.69	0.00	-0.36
FLX2	3	0.05	-0.09	1.00	0.39	-0.05	0.08	0.18	0.30	0.24	0.50
FLX3	4	-0.02	0.17	0.39	1.00	0.32	0.23	0.30	0.36	0.09	0.37
FLX4	5	-0.18	0.15	-0.05	0.32	1.00	0.12	0.08	0.06	-0.02	-0.02
FLX5	6	-0.19	-0.05	0.08	0.23	0.12	1.00	-0.05	0.08	0.10	0.38
FLX6	7	0.08	0.11	0.18	0.30	0.08	-0.05	1.00	0.17	0.05	0.21
FLX7	8	0.06	0.69	0.30	0.36	0.06	0.08	0.17	1.00	0.06	0.01
FLX8	9	0.10	0.00	0.24	0.09	-0.02	0.10	0.05	0.06	1.00	0.14
FLX9	10	-0.03	-0.36	0.50	0.37	-0.02	0.38	0.21	0.01	0.14	1.00
IDNO	11	1.00	-0.01	0.05	-0.02	-0.18	-0.19	0.08	0.06	0.10	-0.03
TPR1	12	-0.21	0.17	-0.67	-0.04	0.25	0.21	-0.08	-0.09	-0.13	-0.40
TPR2	13	0.11	0.04	0.46	0.63	0.06	0.09	0.39	0.31	-0.03	0.38
TPR3	14	0.03	0.39	-0.34	0.16	0.23	-0.07	0.23	0.13	0.19	-0.26
TPR4	15	-0.10	0.24	-0.19	0.05	-0.02	0.06	-0.26	0.06	-0.27	-0.12
TPR5	16	0.06	-0.12	0.77	0.45	0.01	-0.04	0.13	0.20	0.04	0.38
TPR6	17	0.01	0.36	0.03	0.20	-0.11	0.32	0.13	0.41	0.28	0.02
TPR7	18	0.03	-0.20	0.74	0.40	-0.06	0.09	0.21	0.15	-0.02	0.43
IDNO	19	1.00	-0.01	0.05	-0.02	-0.18	-0.19	0.08	0.06	0.10	-0.03
RCS1	20	-0.02	0.08	0.58	0.39	0.06	-0.00	0.11	0.29	0.05	0.24
RCS2	21	0.07	0.14	0.37	0.23	0.04	0.08	0.02	0.32	0.06	0.21
RCS3	22	-0.12	-0.04	-0.50	-0.10	0.05	0.15	-0.02	-0.15	0.03	-0.02
RCS4	23	-0.07	0.25	-0.29	-0.17	0.01	-0.01	-0.14	0.04	-0.02	-0.14
RCS5	24	0.07	-0.10	0.04	-0.09	-0.05	-0.03	-0.15	-0.04	-0.12	0.00
RCS6	25	-0.13	-0.01	0.07	0.12	0.02	-0.09	0.15	-0.02	-0.09	-0.05
RCS7	26	0.01	-0.45	0.04	0.02	0.02	0.06	0.12	-0.27	-0.08	0.20
RCS8	27	0.02	0.07	0.25	0.08	0.05	0.02	0.03	0.17	-0.02	0.04
RCS9	28	0.11	-0.12	-0.11	0.07	-0.00	0.13	-0.08	0.01	0.13	0.14
IDNO	29	1.00	-0.01	0.05	-0.02	-0.18	-0.19	0.08	0.06	0.10	-0.03
COG1	30	-0.24	-0.04	-0.40	-0.17	0.16	0.03	-0.01	-0.19	-0.06	0.02
COG2	31	0.01	-0.13	-0.03	0.04	-0.09	0.20	-0.03	-0.04	-0.11	0.02
COG3	32	0.08	0.05	-0.37	-0.01	0.02	0.05	0.10	-0.07	0.21	-0.18
COG4	33	0.04	-0.03	-0.01	0.11	0.04	0.08	0.13	0.00	0.06	0.10
COG5	34	0.03	-0.07	-0.16	0.01	-0.04	0.15	0.01	-0.05	0.11	0.16
COG6	35	0.03	-0.07	0.07	0.05	-0.12	0.15	-0.06	0.01	0.02	0.20
COG7	36	-0.08	0.02	-0.02	-0.03	0.11	0.05	-0.02	0.02	-0.19	-0.05
COG8	37	0.04	0.13	0.13	0.27	0.04	0.03	0.18	0.21	0.16	0.19

Table 31 - Continued

		IDNO 11	TPR1 12	TPR2 13	TPR3 14	TPR4 15	TPR5 16	TPR6 17	TPR7 18
IDNO	1	1.00	-0.21	0.11	0.03	-0.10	0.06	0.01	0.03
FLX1	2	-0.01	0.17	0.04	0.39	0.24	-0.12	0.36	-0.20
FLX2	3	0.05	-0.67	0.46	-0.34	-0.19	0.77	0.03	0.74
FLX3	4	-0.02	-0.04	0.63	0.16	0.05	0.45	0.20	0.40
FLX4	5	-0.18	0.25	0.06	0.23	-0.02	0.01	-0.11	-0.06
FLX5	6	-0.19	0.21	0.09	-0.07	0.06	-0.04	0.32	0.19
FLX6	7	0.08	-0.08	0.39	0.23	-0.25	0.13	0.13	0.21
FLX7	8	0.06	-0.09	0.31	0.13	0.06	0.20	0.41	0.15
FLX8	9	0.10	-0.13	-0.03	0.19	-0.27	0.04	0.28	-0.02
FLX9	10	-0.03	-0.40	0.38	-0.26	-0.12	0.38	0.02	0.43
IDNO	11	1.00	-0.21	0.11	0.03	-0.10	0.06	0.01	0.03
TPR1	12	-0.21	1.00	-0.26	0.42	0.08	-0.65	0.16	-0.59
TPR2	13	0.11	-0.26	1.00	-0.22	-0.08	0.56	0.17	0.68
TPR3	14	0.03	0.42	-0.22	1.00	0.11	-0.37	0.17	-0.46
TPR4	15	-0.10	0.08	-0.08	0.11	1.00	-0.10	0.03	-0.05
TPR5	16	0.06	-0.65	0.56	-0.37	-0.10	1.00	0.01	0.87
TPR6	17	0.01	0.16	0.17	0.17	0.03	0.01	1.00	0.05
TPR7	18	0.03	-0.59	0.68	-0.46	-0.05	0.87	0.05	1.00
IDNO	19	1.00	-0.21	0.11	0.03	-0.10	0.06	0.01	0.03
RCS1	20	-0.02	-0.43	0.38	-0.17	0.01	0.62	-0.01	0.58
RCS2	21	0.07	-0.24	0.23	-0.05	-0.04	0.36	0.14	0.28
RCS3	22	-0.12	0.51	-0.15	0.20	-0.09	-0.55	-0.01	-0.51
RCS4	23	-0.07	0.23	-0.24	0.09	0.12	-0.31	0.07	-0.38
RCS5	24	0.07	-0.09	-0.03	-0.05	0.22	0.03	0.01	0.11
RCS6	25	-0.13	-0.12	0.12	0.01	0.07	0.17	-0.12	0.14
RCS7	26	0.01	-0.03	0.05	-0.11	-0.12	0.08	-0.18	0.16
RCS8	27	0.02	-0.16	0.11	-0.01	0.03	0.27	0.04	0.20
RCS9	28	0.11	0.13	0.05	0.08	-0.09	-0.14	-0.01	-0.17
IDNO	29	1.00	-0.21	0.11	0.03	-0.10	0.06	0.01	0.03
COG1	30	-0.24	0.33	-0.35	0.22	0.06	-0.38	-0.09	-0.40
COG2	31	0.01	0.11	0.23	-0.19	0.02	-0.02	0.03	0.13
COG3	32	0.03	0.39	-0.08	0.30	-0.08	-0.45	0.10	-0.40
COG4	33	0.04	0.03	0.09	0.08	-0.07	0.06	0.10	0.06
COG5	34	0.03	0.19	0.05	0.11	-0.08	-0.23	0.10	-0.19
COG6	35	0.03	-0.06	0.07	-0.01	0.11	0.09	0.11	0.09
COG7	36	-0.08	0.05	0.05	-0.02	0.10	-0.03	-0.09	0.02
COG8	37	0.04	-0.12	0.16	0.10	0.01	0.12	0.19	0.11

Table 31 - Continued

		IDNO 1	RCS1 2	RCS2 3	RCS3 4	RCS4 5	RCS5 6	RCS6 7	RCS7 8	RCS8 9	RCS9 10
IDNO	1	1.00	-0.02	0.07	-0.12	-0.07	0.07	-0.13	0.01	0.02	0.11
FLX1	2	-0.01	0.08	0.14	-0.04	0.25	-0.10	-0.01	-0.45	0.17	-0.12
FLX2	3	0.05	0.58	0.37	-0.50	-0.29	0.04	0.07	0.04	0.25	-0.11
FLX3	4	-0.02	0.39	0.23	-0.10	-0.17	-0.09	0.12	0.02	0.08	0.07
FLX4	5	-0.18	0.06	0.04	0.05	0.01	-0.05	0.02	0.02	0.05	-0.00
FLX5	6	-0.19	-0.00	0.08	0.15	-0.01	-0.03	-0.09	0.06	0.02	0.13
FLX6	7	0.08	0.11	0.02	-0.02	-0.14	-0.15	0.15	0.12	0.03	-0.08
FLX7	8	0.06	0.29	0.32	-0.15	0.04	-0.04	-0.02	-0.27	0.17	0.01
FLX8	9	0.11	0.05	0.06	0.03	-0.02	-0.02	-0.09	-0.08	-0.02	0.13
FLX9	10	-0.03	0.24	0.21	-0.02	-0.14	0.00	-0.05	0.20	0.04	0.14
IDNO	11	1.00	-0.02	0.07	-0.12	-0.07	0.07	-0.13	0.01	0.02	0.11
TPR1	12	-0.21	-0.43	-0.24	0.51	0.23	-0.09	-0.12	-0.03	-0.16	0.13
TPR2	13	0.11	0.38	0.23	-0.15	-0.24	-0.03	0.12	0.05	0.11	0.05
TPR3	14	0.13	-0.17	-0.05	0.20	0.09	-0.05	0.01	-0.10	-0.01	0.06
TPR4	15	-0.19	0.01	-0.04	-0.09	0.12	0.22	0.07	-0.12	0.00	-0.09
TPR5	16	0.06	0.62	0.36	-0.55	-0.31	0.03	0.17	0.08	0.27	-0.14
TPR6	17	0.01	-0.01	0.14	-0.01	0.07	0.01	-0.12	-0.18	0.04	-0.01
TPR7	18	0.03	0.58	0.28	-0.51	-0.38	0.11	0.14	0.16	0.20	-0.17
IDNO	19	1.00	-0.02	0.07	-0.12	-0.07	0.07	-0.13	0.01	0.02	0.11
RCS1	20	-0.02	1.00	0.51	-0.46	-0.25	-0.05	0.42	-0.06	0.32	-0.06
RCS2	21	0.07	0.51	1.00	-0.22	0.15	-0.14	-0.02	-0.36	0.42	0.14
RCS3	22	-0.12	-0.46	-0.22	1.00	0.25	-0.11	-0.13	-0.02	-0.20	0.53
RCS4	23	-0.07	-0.25	0.15	0.25	1.00	-0.37	-0.39	-0.51	-0.20	-0.14
RCS5	24	0.07	-0.05	-0.14	-0.11	-0.37	1.00	0.02	0.16	0.14	0.07
RCS6	25	-0.13	0.42	-0.02	-0.13	-0.39	0.02	1.00	0.13	0.40	0.01
RCS7	26	0.01	-0.06	-0.36	-0.02	-0.51	0.16	0.13	1.00	-0.15	-0.17
RCS8	27	0.02	0.32	0.42	-0.20	-0.20	0.14	0.40	-0.15	1.00	0.17
RCS9	28	0.11	-0.06	0.14	0.53	-0.14	0.07	0.01	-0.17	0.17	1.00
IDNO	29	1.00	-0.02	0.07	-0.12	-0.07	0.07	-0.13	0.01	0.02	0.11
COG1	30	-0.24	-0.30	-0.23	0.42	0.14	-0.12	-0.06	0.08	-0.16	0.06
COG2	31	0.01	-0.09	-0.06	0.18	-0.07	0.08	0.03	0.10	-0.12	0.11
COG3	32	0.08	-0.33	-0.11	0.40	0.16	-0.27	-0.01	-0.09	-0.10	0.22
COG4	33	0.04	0.04	0.04	0.17	-0.13	-0.03	0.03	0.03	0.03	0.07
COG5	34	0.03	-0.23	-0.10	0.37	0.12	-0.04	-0.20	0.03	-0.12	0.20
COG6	35	0.03	0.08	0.05	0.08	-0.09	0.04	-0.02	0.05	0.03	0.10
COG7	36	-0.08	-0.08	-0.09	0.09	-0.04	0.06	-0.01	0.04	-0.03	-0.00
COG8	37	0.04	0.16	0.22	0.00	0.03	-0.04	-0.02	-0.12	0.08	-0.00

Table 31 - Continued

		IDNO 11	COG1 12	COG2 13	COG3 14	COG4 15	COG5 16	COG6 17	COG7 18	COG8 19
IDNO	1	1.00	-0.24	0.01	0.08	0.04	0.03	0.03	-0.08	0.04
FLX1	2	-0.01	-0.04	-0.13	0.05	-0.03	-0.07	-0.07	0.02	0.13
FLX2	3	0.05	-0.40	-0.03	-0.37	-0.01	-0.16	0.07	-0.02	0.13
FLX3	4	-0.02	-0.17	0.04	-0.01	0.11	0.01	0.05	-0.03	0.27
FLX4	5	-0.18	0.16	-0.09	0.02	0.04	-0.04	-0.12	0.11	0.04
FLX5	6	-0.19	0.03	0.20	0.05	0.08	0.15	0.15	0.05	0.03
FLX6	7	0.08	-0.01	-0.03	0.10	0.13	0.01	-0.06	-0.02	0.18
FLX7	8	0.06	-0.19	-0.04	-0.07	0.00	-0.05	0.01	0.02	0.21
FLX8	9	0.10	-0.06	-0.11	0.21	0.06	0.11	0.02	-0.19	0.16
FLX9	10	-0.03	0.02	0.02	-0.18	0.10	0.16	0.20	-0.05	0.19
IDNO	11	1.00	-0.24	0.01	0.08	0.04	0.03	0.03	-0.08	0.04
TPR1	12	-0.21	0.33	0.11	0.39	0.03	0.19	-0.06	0.05	-0.12
TPR2	13	0.11	-0.35	0.23	-0.08	0.09	0.05	0.07	0.05	0.15
TPR3	14	0.03	0.22	-0.18	0.33	0.06	0.11	-0.01	-0.02	0.10
TPR4	15	-0.10	0.06	0.02	-0.08	-0.07	-0.08	0.11	0.10	0.01
TPR5	16	0.06	-0.38	-0.02	-0.45	0.06	-0.23	0.09	-0.03	0.12
TPR6	17	0.01	-0.09	0.03	0.10	0.10	0.10	0.11	-0.09	0.19
TPR7	18	0.03	-0.40	0.10	-0.40	0.06	-0.19	0.09	0.02	0.11
IDNO	19	1.00	-0.24	0.01	0.08	0.04	0.03	0.03	-0.08	0.04
RCS1	20	-0.02	-0.30	-0.09	-0.33	0.04	-0.23	0.08	-0.08	0.16
RCS2	21	0.07	-0.23	-0.06	-0.11	0.04	-0.10	0.05	-0.09	0.22
RCS3	22	-0.12	0.42	0.18	0.40	0.17	0.37	0.08	0.09	0.00
RCS4	23	-0.07	0.14	-0.07	0.16	-0.13	0.12	-0.09	-0.04	0.03
RCS5	24	0.07	-0.12	0.08	-0.27	-0.03	-0.04	0.04	0.06	-0.04
RCS6	25	-0.13	-0.06	0.03	-0.01	0.03	-0.20	-0.02	-0.01	-0.02
RCS7	26	0.01	0.08	0.10	-0.09	0.03	0.03	0.05	0.04	-0.12
RCS8	27	0.02	-0.16	-0.02	-0.10	0.03	-0.12	0.03	-0.03	0.08
RCS9	28	0.11	0.06	0.11	0.22	0.07	0.20	0.10	-0.00	-0.00
IDNO	29	1.00	-0.24	0.01	0.08	0.04	0.03	0.03	-0.08	0.04
COG1	30	-0.24	1.00	-0.23	0.10	0.13	0.25	0.07	-0.00	0.14
COG2	31	0.01	-0.23	1.00	0.15	0.13	0.30	0.19	0.03	-0.14
COG3	32	0.08	0.10	0.15	1.00	0.08	0.28	0.06	-0.20	0.16
COG4	33	0.04	0.13	0.13	0.08	1.00	0.14	0.01	-0.13	0.51
COG5	34	0.03	0.25	0.30	0.28	0.14	1.00	0.50	-0.31	0.26
COG6	35	0.03	0.07	0.19	0.06	0.01	0.50	1.00	-0.13	0.13
COG7	36	-0.08	-0.00	0.03	-0.20	-0.13	-0.31	-0.13	1.00	-0.26
COG8	37	0.04	0.14	-0.14	0.16	0.51	0.26	0.13	-0.26	1.00

Table 32

Multiple Range Test - Florida Climate and Control System

Factor 1 - Strong Control

Grade Level	Mean	NSR*	S.D.	N
Second	51.55		6.96	45
Continuing First	51.20		6.16	91
Kindergarten	49.37		6.76	86
Entering First	48.76		5.40	67

F = 3.10 a

*Non-significant range $^{a}p < .05$

Table 33

Multiple Range Test - Florida Climate and Control System

Factor 2 - Pupil Free Choice vs No Choice

Grade Level	Mean	NSR*	S.D.	N
Kindergarten	52.07		5.15	86
Second	49.86		6.59	45
Continuing First	49.56		6.31	91
Entering First	48.47		5.53	67

F = 5.28 b

*Non-significant range $^{b}p < .01$

Table 34

Multiple Range Test - Florida Climate and Control System

Factor 3 - Teacher-Pupil Supportive Behavior

Grade Level	Mean	NSR*	S.D.	N
Entering First	50.20		6.03	67
Kindergarten	50.09		5.61	86
Second	49.96		7.21	45
Continuing First	49.43		6.21	91

F = 0.25

*Non-significant range

Table 35

Multiple Range Test - Florida Climate and Control System

Factor 4 - Nonverbal Gentle Control

Grade Level	Mean	NSP*	S.D.	N
Entering First	50.45		7.34	67
Kindergarten	50.24		6.23	86
Second	49.51		6.13	45
Continuing First	49.49		6.94	91

F = 0.39

*Non-significant range

Table 36

Multiple Range Test - Florida Climate and Control System

Factor 5 - Gentle Control

Grade Level	Mean	NSR*	S.D.	N
Entering First	51.50	|	6.80	67
Kindergarten	50.24	|	6.52	86
Continuing First	49.21	|	6.56	91
Second	47.83	|	6.68	45

$F = 3.17^{a}$

*Non-significant range $^{a}p < .05$

Table 37

Multiple Range Test - Florida Climate and Control System

Factor 6 - Work Without Teacher

Grade Level	Mean	NSR*	S.D.	N
Entering First	51.56	|	7.13	67
Continuing First	51.29	|	6.73	91
Second	51.13	|	7.84	45
Kindergarten	46.88		5.31	86

$F = 9.16^{b}$

*Non-significant range $^{b}p < .01$

Table 38

Multiple Range Test - Florida Climate and Control System

Factor 7 - Pupil Negative Affect

Grade Level	Mean	NSR*	S.D.	N
Kindergarten	50.87	|	6.53	86
Continuing First	50.70	|	6.48	91
Second	50.32	|	4.89	45
Entering First	48.84	|	5.88	67

F = 1.63

*Non-significant range

Table 39

Multiple Range Test - Florida Climate and Control System

Factor 8 - Teacher Attention in a Task Setting

Grade Level	Mean	NSR*	S.D.	N
Entering First	50.86	|	7.33	67
Continuing First	50.14	|	5.98	91
Kindergarten	49.60	| |	6.05	86
Second	47.71	|	5.97	45

F = 2.38

*Non-significant range

Table 40

Multiple Range Test - Florida Climate and Control System

Factor 9 - Teacher Positive Affect

Grade Level	Mean	NSR*	S.D.	N
Kindergarten	51.36	|	6.38	86
Entering First	49.65	|	6.62	67
Continuing First	49.01	|	6.78	91
Second	47.98	|	7.70	45

F = 2.99a

*Non-significant range

a$p < .05$

Teacher Practices Observation Record (TPOR)

The factor analysis of the TPOR differs from many analyses in that the strongest factors, those with the highest eigenvalues, no longer emerged first after rotation. Rather, Factors 5 and 7 are among the strongest, with Factor 5 being similar to one which has typically been first in previous analysis.

Factor 1 - Convergent Teaching

The central idea of this factor (Table 41) appears to be the production of right answers, quickly and certainly. The teaching revolves around the teacher, and is narrowly focused on the question at hand.

Factor 2 - Experimental Teaching

This is experimental teaching in the Deweyan sense. The heaviest loading items appear to deal with the confrontation of the pupil with a problem which "stumps" him, and about which he is given time to sit, think, and mull things over (Table 42). At the same time, the teacher is concerned that problem solutions be accurate, logical, and realistic. The central thread appears to be the pupil being put on his own to explore ideas, collect data, propose solutions, and evaluate them, but the teacher questions errors and misconceptions.

Factor 3 - Teacher Discourages Exploration

The central idea of this factor appears to be narrowing the focus, or restricting the activities of the pupil (Table 43). The series of verbs are expressive -- discourages, prevents, steers away, stops; supplemented by preventing doubt, providing answers, and evaluating all by the same standard.

Factor 4 - Undifferentiated Teaching

The title, in this case, appears to contain virtually all of the information in the factor. Whether a factor with only three items in it warrants mention is somewhat uncertain, but it is cited since two of the loadings are over .90 (See Table 44).

Factor 5 - Pupil Free Choice vs Teacher-Structured Activity

This factor (Table 45) is a relatively clear parallel to the factor which has emerged first in previous analyses. The positive pole of the factor involves the pupil being active in his own learning and approaching it through a variety of materials and activities, in contrast to the teacher structuring and directing, with the pupil following the teacher's lead. Pupil choice vs teacher direction appears to be a central element. This is the factor with the largest eigenvalue, suggesting that it is an important dimension that discriminates classrooms.

Table 41

Teacher Practices Observation Record

Factor 1 - Convergent Teaching

Item	Loading	Description
1	.42	T occupies center of attention
21	.70	T accepts only one answer as being correct
23	.82	T expects p to come up with answer T has in mind
25	.70	T expects p to "know" rather than to guess answer to Q
27	.74	T accepts only answers or suggestions closely related to topic
45	.45	T immediately reinforces p's answer as"right"or "wrong"
47	.52	T asks another p to give answer if one p fails to answer quickly

Eigenvalue = 4.42

Table 42

Teacher Practices Observation Record

Factor 2 - Experimental Teaching

Item	Loading	Description
14	.47	T involves p in uncertain or incomplete situation
16	.67	T leads p to Q or problem which "stumps" him
18	.48	T emphasizes realistic, disconcerting, or "ugly" aspects of topic
24	.43	T asks p to judge comparative value of answers or suggestions
26	.46	T encourages p to guess or hypothesize about the unknown or untested
32	.51	T has p make his own collection and analysis of subject matter
34	.56	T has p find detailed facts and information on his own
38	.71	T helps p discover and correct factual errors and inaccuracies
40	.61	T questions misconceptions, faulty logic, unwarranted conclusions
42	.46	T withholds judgment on p's behavior or work
46	.42	T has p decide when Q has been answered satisfactorily
48	.52	T asks p to evaluate his own work
50	.65	T gives p time to sit and think, mull things over

Eigenvalue = 5.37

Table 43

Teacher Practices Observation Record

Factor 3 - Teacher Discourages Exploration

Item	Loading	Description
9	.52	T discourages or prevents p from expressing self freely
13	.66	T prevents situation which causes p doubt or perplexity
15	.65	T steers p away from "hard" Q or problem
35	.45	T relies heavily on textbook as source of information
43	.59	T stops p from going ahead with plan with T knows will fail
49	.52	T provides answer to p who seems confused or puzzled
55	.64	T evaluates work of all p by a set standard

Eigenvalue = 3.91

Table 44

Teacher Practices Observation Record

Factor 4 - Undifferentiated Teaching

Item	Loading	Description
51	.92	T has all p working at same task at same time
53	.57	T hold all p responsible for certain material to be learned
52	-.92	T has different p working at different tasks

Eigenvalue = 2.71

Table 45

Teacher Practices Observation Record

Factor 5 - Pupil Free Choice vs Teacher Structured Activity

Item	Loading	Description
2	.61	T makes P center of attention
4	.74	T makes doing something center of P's attention
6	.65	T has P participate actively
8	.68	T joins or participates in P's activities
10	.42	T encourages P to express self freely
12	.60	T organizes learning around P's own problem or Q
32	.52	T has P make his own collection and analysis of subject matter
36	.47	T makes a wide range of informational material available
44	.51	T encourages P to put his ideas to a test
54	.59	T has P work independently on what concerns P
60	.68	T approaches subject matter in indirect, informal way
1	-.50	T occupies center of attention
3	-.68	T makes some thing as a thing center of P's attention
5	-.67	T has P spend time waiting, watching, listening
11	-.61	T organizes learning around Q posed by T
19	-.50	T asks Q that P can answer only if he studied the lesson
25	-.45	T expects P to "know" rather than to guess answer to Q
31	-.48	T collects and analyses subject matter for P
33	-.47	T provides P with detailed facts and information
59	-.69	T approaches subject matter in direct, business-like way

Eigenvalue = 8.39

Factor 6 - Unnamed

No coherent pattern appears in this factor and the number of items is small, so it has not been named (Table 46).

Factor 7 - Exploration of Ideas vs Textbook Teaching

There are strong elements of Deweyan experimentalism in this factor (Table 47), as well as in Factor 2, Experimental Teaching. In many ways the positive pole of this factor appears to be the obverse of Factor 3, Teacher discourages exploration. Again, the verbs are indicative -- encourages, permits, asks, entertains, makes available, motivates -- in effect expanding possibilities, in contrast to relying on the textbook, passing judgment, immediate reinforcement, extrinsic motivation, and a formal procedure -- in effect restricting possibilities.

Relations between factors in the TPOR - Relations between several of the factors in the TPOR are surprisingly high. This may not be surprising in the sense that the instrument is intended to measure a single dimension -- Deweyan experimentalism (Table 31, p. 61). But if the instrument were a single dimension, of course, it should have produced only a single factor, but the lowest eigenvalue was more than two, and five were larger than three. Factor 1, Convergent Teaching, correlates strongly negatively with Factor 5, Pupil Free Choice vs Teacher Structured Activity (the sign indicates that convergent teaching and teacher structured activity go together). The same factor also correlates strongly negatively with Factor 7, Exploration of Ideas vs Textbook Learning. The correlation between Factors 5 and 7 is .87, which is high enough to be a reliability coefficient. Factor 2, Experimental Teaching, also correlates with Factors 5 and 7, but correlates positively.

Relations between TPOR and FLACCS - The same association of TPOR Factors 1, 5, and 7 appear in relation to FLACCS 2, Pupil Free Choice. TPOR 1, Convergent Teaching relates negatively and 5, Pupil Free Choice and 6, Exploration of Ideas, relates positively as would be expected. Correlations this high across instruments which have no common theoretical ground are surprising and supportive. An especially interesting relationship exists between FLACCS 3, Teacher-Pupil Supportive Behavior, and TPOR 2, Experimental Teaching. It suggests that the TPOR factor shows the intellectual side of the pupil's confrontation with a difficult problem and the teacher's correction of his errors, while the FLACCS factor shows the personal interaction in which the teacher waits in a friendly manner, corrects without criticism, the pupil seeks reassurance and gets it from the teacher, and receives agreement and support from other pupils.

Grade level differences in TPOR factors - Six of the seven factors differentiated grade levels significantly (Tables 48-54). Second grade and kindergarten were separated from the other two grades on several factors. This seems surprising but probably represents again the underrepresentation of structured programs in the second grade sample. These two grades were low in Convergent Teaching, and high in Exploration of Ideas. Kindergarten was low in Experimental Teaching (a relatively cognitive activity), and high in Pupil Free Choice. Second grade was high in Experimental Teaching, and in Undifferentiated Teaching. All of these differences seem reasonable.

Table 46

Teacher Practices Observation Record

Factor 6 - Unnamed

Item	Loading	Description
20	.52	T asks Q that is not readily answerable by study of lesson
29	.44	T lets P "get by" with opinionated or stereotyped answer
56	.60	T evaluates work of different P by different standards
61	.45	T imposes external disciplinary control on P

Eigenvalue = 2.18

Table 47

Teacher Practices Observation Record

Factor 7 - Exploration of Ideas vs. Textbook Learning

Item	Loading	Description
10	.60	T encourages P to express self freely
22	.71	T permits P to suggest additional or alternative answers
24	.43	T asks P to judge comparative value of answers or suggestions
26	.59	T encourages P to guess or hypothesize about the unknown or untested
28	.58	T entertains even "wild" or far-fetched suggestion of P
32	.43	T has P make his own collection and analysis of subject matter
36	.45	T makes a wide range of informational material available
44	.43	T encourages P to put his ideas to a test
58	.56	T motivates P with intrinsic value of ideas or activity
60	.50	T approaches subject matter in indirect, informal way
62	.47	T encourages self-discipline on part of P
35	-.43	T relies heavily on textbook as a source of information
41	-.42	T passes judgment on P's behavior and work
45	-.41	T immediately reinforces P's answer as "right" or "wrong"
57	-.43	T motivates P with privileges, prizes, grades
59	-.46	T approaches subject matter in direct, business-like way

Eigenvalue = 6.02

Table 48

Multiple Range Test - Teacher Practices Observation Record

Factor 1 - Convergent Teaching

Grade Level	Mean	NSR*	S.D.	N
Entering First	52.37		6.82	67
Continuing First	51.21		7.99	91
Second	49.72		6.81	45
Kindergarten	47.82		6.83	86

$F = 5.81^{b}$

*Non-significant range $^{b}p < .01$

Table 49

Multiple Range Test - Teacher Practices Observation Record

Factor 2 - Experimental Teaching

Grade Level	Mean	NSR*	S.D.	N
Second	52.59		6.94	45
Entering First	50.51		5.73	67
Continuing First	49.95		6.08	91
Kindergarten	48.78		4.41	86

$F = 2.97^{a}$

*Non-significant range $^{a}p < .05$

Table 50

Multiple Range Test - Teacher Practices Observation Record

Factor 3 - Teacher Discourages Exploration

Grade Level	Mean	NSR*	S.D.	N
Entering First	51.39		6.50	67
Continuing First	51.09		6.36	91
Second	51.00		6.37	45
Kindergarten	49.11		4.76	86

F = 2.45

*Non-significant range

Table 51

Multiple Range Test - Teacher Practices Observation Record

Factor 4 - Undifferentiated Teaching

Grade Level	Mean	NSR*	S.D.	N
Second	52.93		9.75	45
Kindergarten	50.70		6.79	86
Continuing First	50.59		8.52	91
Entering First	47.27		7.45	67

F = 4.50[b]

*Non-significant range [b]$p < .01$

Table 52

Multiple Range Test - Teacher Practices Observation Record

Factor 5 - Pupil Free Choice vs Teacher Structured Activity

Grade Level	Mean	NSR*	S.D.	N
Kindergarten	52.32		6.28	86
Second	49.56		6.88	45
Continuing First	48.84		6.02	91
Entering First	47.58		5.96	67

$F = 8.23^{b}$

*Non-significant range $^{b}p < .01$

Table 53

Multiple Range Test - Teacher Practices Observation Record

Factor 6 - Unnamed

Grade Level	Mean	NSR*	S.D.	N
Entering First	51.55		6.33	67
Continuing First	50.62		4.94	91
Kindergarten	49.95		5.16	86
Second	48.36		3.44	45

$F = 3.67^{a}$

*Non-significant range $^{a}p < .05$

Table 54

Multiple Range Test - Teacher Practices Observation Record

Factor 7 - Exploration of Ideas vs Textbook Learning

Grade Level	Mean	NSR*	S.D.	N
Second	51.00	|	6.29	45
Kindergarten	50.97	|	5.62	86
Continuing First	48.91		6.36	91
Entering First	48.63		6.64	67

$F = 3.00^{a}$

*Non-significant range

$^{a}p < .01$

Reciprocal Category System (RCS)

This system and the one that follows, the Taxonomy of Cognitive Behavior, were both coded from audio tapes made simultaneously with the live observations in the classroom. Each represents a relatively restricted portion of the total classroom interaction, since only verbal interaction and that which was available to a microphone is represented. On the other hand, it is relatively inexpensive information, and perhaps need not add a great deal to the total study to justify its collection.

Factor 1 - Varied Pupil Initiated Interaction vs Response to Teacher

The heaviest loadings are for the two pupil initiation categories (one as a total of all interaction in the classroom, the other as a proportion of pupil talk)(Table 55). Pupil direction giving and interruption follow, with flexibility of interaction between teacher and pupil. Teacher broad question loads at a moderate level, but this is not contradictory, since a pupil response to a divergent teacher question would be classified as a pupil initiation rather than a pupil response. The negative pole of the factor is a marginal one, but represents pupil response rather than initiation, along with Teacher Talk.

Factor 2 - Teacher Response and Amplification

High loadings in the factor all appeared to involve either teacher response or amplification of a pupil idea (Table 56). The other items of flexibility of interaction and Pupil question, teacher response seem to go together.

Factor 3 - Drill

The interpretation of the factor (Table 57) seems relatively clear since the heaviest loadings all represent teacher questions, narrow questions, drill, or pupil response (which is a response to a narrow question). The negative pole of the factor does not appear to contribute toward understanding of the factor.

Factor 4 - Teacher Direction and Criticism vs Teacher Indirect

The positive pole of the factor is largely made up of the items which Flanders described as "vicious circle." (Table 58). This is a sequence in which the teacher gives directions, pupils don't follow them to the teacher's satisfaction apparently, so she criticizes, gives more directions, pupils drag their feet, and the vicious circle spirals. The only item in the positive pole which does not fit that interpretation of the factor is Teacher extended question. Its meaning here is not clear. If the positive pole of the factor is taken as one which represents management problems, then the negative pole of the factor seems to represent a variety of aspects of a task-oriented, smoothly running classroom. The teacher emits indirect behavior, initiates, and pupils interrupt, but the highest loading of all is for the total number of tallies -- a reflection of the amount of codeable tape which, in turn, is likely to reflect an active but orderly classroom.

Table 55

Reciprocal Category System

Factor 1 - Varied Pupil Initiated Interaction vs Response to Teacher

Item	Loading	Description
11	.55	Pupil elicits
13	.89	Pupil initiates
14	.78	Pupil directs
15	.42	Pupil corrects
19	.81	Pupil initiation (percent of P talk)
28	.60	Teacher broad question
29	.43	Pupil broad question
31	.62	Pupil substantive interruption
32	.60	Pupil direct interruption
33	.64	Total pupil interruption
34	.40	Pupil question, teacher question
37	.42	Teacher-pupil flexibility
38	.46	Pupil-teacher flexibility
49	.58	Student talk
56	.50	Pupil direction and criticism
12	-.43	Pupil responds
17	-.44	Teacher talk, percent
20	-.57	Student response to teacher

Eigenvalue = 7.20

Table 56

Reciprocal Category System

Factor 2 - Teacher Response and Amplification

Item	Loading	Description
3	.76	Teacher amplifies
5	.79	Teacher responds
11	.50	Pupil elicits
35	.74	Pupil question, teacher response
37	.65	Teacher-pupil flexibility
38	.59	Pupil-teacher flexibility
40	.59	Total flexibility
43	.76	Teacher amplify/direct, percent

Eigenvalue = 4.85

Table 57

Reciprocal Category System

Factor 3 - Drill

Item	Loading	Description
2	.53	Teacher accepts
4	.88	Teacher elicits
12	.58	Pupil responds
20	.67	Student response to teacher
27	.90	Teacher narrow question
42	.56	Teacher elicit-initiate, percent
48	.64	Teacher talk
50	.90	Drill
61	.57	Total teacher talk
10	-.61	Silence
19	-.42	Pupil initiation
58	-.42	Teacher initiation, percent

Eigenvalue = 6.31

Table 58

Reciprocal Category System

Factor 4 - Teacher Direction and Criticism vs Teacher Indirect

Item	Loading	Description
7	.66	Teacher directs
9	.47	Teacher cools, formalizes
23	.87	Teacher extended direct
36	.46	Teacher-teacher flexibility
44	.58	Teacher extended question
55	.89	Teacher direction and criticism
24	-.46	Teacher revised I/D
31	-.43	Pupil substantive interruption
33	-.41	Total pupil interruption
57	-.48	Teacher indirect-direct, percent
58	-.48	Teacher initiation, percent
60	-.67	Total number of tallies for all sets (raw)

Eigenvalue = 5.45

Factor 5 - Extended Teacher Talk

The two highest loadings are for steady-state teacher talk; that is, teacher talk which is uninterruped by pupil talk, and extended teacher initiation (Table 59). Total teacher initiation also loads heavily. There are moderate loadings for the total amount of teacher talk as a percent of total interaction, and as a percent of teacher talk, teacher initiation as a percent of teacher talk, and the average length of each teacher initiation. The factor is made up entirely of teacher talk, and especially extended teacher talk. This seems striking in lower grade classrooms.

Factor 6 - Pupil Talk

Two of the three heaviest loadings are made up of pupil talk and continuing pupil talk, but inquiry enters as well (Table 60). Inquiry is made up of the sum of the 3-3 plus 4-4 plus 15-15 plus 16-16 cells, and probably loads since the 15-15 and 16-16 cells typically have the highest frequency of any of the steady-state student talk cells. Probably the title "Inquiry" is misleading in this case. This factor appears to parallel the previous one which represented extended teacher talk.

Factor 7 - Teacher Acceptance vs Teacher Correction

Although there are only a small number of items making up the two poles of this factor, the high loadings warrant naming them (Table 61). Teacher acceptance appears in both of the items for the positive pole, but only in contrast to rejection or correction of pupils. The negative pole had a high loading for Teacher corrects with teacher criticism and varied sequences of teacher talk also entering.

Factor 8 - Supportive Pupil Talk

The high loadings for Pupil positive participation and Pupil revised I/D_1 in this factor (Table 62) both involve the supportive response of pupils to other pupils. The pupil indirect behaviors of warming, accepting, and amplifying also enter moderately heavily. The pupil indirect interruption implies that the pupil interrupted to praise, accept or amplify, and this supports the rest of the factor. Flexibility implies the occurrence of a variety of pupil talk categories. Confusion is the code used when the interaction could not be understood, and the coder judged that he would not have been able to understand the interaction had he been in the classroom himself. This is an active, diverse classroom with a positive pupil emotional climate with no teacher talk, and the total pupil talk which could be coded is not high.

Factor 9 - Teacher-Pupil Interaction in Accepting Climate

In this factor (Table 63), the pairing of heavy loadings for Teacher accepts and Pupil initiation following teacher indirect, suggests a generally warm, supportive, accepting emotional climate in which pupils feel free to initiate. A variety of other measures of Teacher indirect behavior support this interpretation.

Table 59

Reciprocal Category System

Factor 5 - Extended Teacher Talk

Item	Loading	Description
6	.84	Teacher initiates
17	.67	Teacher talk, percent
45	.89	Steady-state teacher initiation
46	.90	Steady-state teacher talk
48	.56	Teacher talk
51	.64	Average length of teacher initiation
58	.62	Teacher initiation, percent
61	.40	Total teacher talk
42	-.62	Teacher elicit-initiate, percent
49	-.40	Student talk

Eigenvalue = 5.31

Table 60

Reciprocal Category System

Factor 6 - Pupil Talk

Item	Loading	Description
21	.93	Pupil-pupil talk
39	.54	Pupil-pupil flexibility
47	.93	Steady-state student talk
49	.42	Student talk
52	.93	Inquiry
53	.84	Inquiry-drill, percent

Eigenvalue = 4.89

Table 61

Reciprocal Category System

Factor 7 - Teacher Acceptance vs Teacher Correction

Item	Loading	Description
18	.86	Teacher acceptance-rejection, percent
41	.86	Teacher accept-correct, percent
8	-.75	Teacher corrects
9	-.49	Teacher cools, formalizes
36	-.47	Teacher-teacher flexibility

Eigenvalue = 3.28

Table 62

Reciprocal Category System

Factor 8 - Supportive Pupil Talk

Item	Loading	Description
16	.42	Confusion
25	.85	Pupil positive participation, percent
26	.87	Pupil revised I/D_1
30	.51	Pupil indirect interruption
39	.47	Pupil-pupil flexibility
59	.74	Pupil warms, accepts, amplifies

Eigenvalue = 3.70

Table 63

Reciprocal Category System

Factor 9 - Teacher-Pupil Interaction in Accepting Climate

Item	Loading	Description
1	.59	Teacher warms, informalizes the climate
2	.70	Teacher accepts
8	.43	Teacher corrects
22	.60	Teacher extended indirect
24	.49	Teacher revised I/D
54	.68	Pupil initiation following teacher indirect
57	.64	Teacher indirect-direct, percent

Eigenvalue = 4.02

Intercorrelations between RCS factors - Table 31-3, p. 62 shows all the relations between RCS and itself as well as TPOR and FLACCS. Factor 1, Varied pupil initiated interaction, correlated moderately highly with Factor 2, Teacher response and amplification. Pupil questions are a common element in both factors, accompanying pupil initiation in the first and teacher response in the second. Factor 3, Drill, correlated with Factor 9, Teacher-pupil interaction in an accepting climate, with teacher acceptance occurring in both factors. Factor 4, Teacher direction and criticism, correlated negatively with Factor 7, Teacher acceptance vs teacher correction. The direction of the correlation indicates that teacher correction from Factor 7 is associated with teacher direction and criticism from Factor 4, which seems reasonable.

Relations between RCS, FLACCS and TPOR - There were two correlations above .50 between RCS and FLACCS, both for FLACCS Factor 2, Pupil free choice (Table 31-3, p. 62). It correlated positively with RCS 1, Varied pupil initiated interaction, and it seems reasonable that there should be much pupil initiation in a free choice setting. Pupil free choice correlated negatively with RCS 3, Drill, which would involve little pupil freedom. Support for consistency across instruments can also be seen in the moderate negative correlation between FLACCS 1, Strong control, and RCS 7, Teacher acceptance vs teacher correction, which associates strong control (which involved negative affect) with correction and criticism.

There were five correlations over .50 between RCS and TPOR, but they involve only three TPOR factors, which were themselves intercorrelated. RCS 1, Varied pupil initiated interaction, correlated positively with TPOR 5, Pupil free choice, which parallels the correlation with the FLACCS free choice factor. It also correlated with TPOR 7, Exploration of ideas vs textbook teaching, which involves considerable pupil freedom, especially in interaction. RCS 3, Drill, related to the cluster of TPOR 1, 5 and 7, whose interrelationship has been noted earlier. Drill, then, was related positively to Convergent teaching, and negatively related to Pupil free choice and Exploration of ideas.

Grade level differences for the RCS - These differences are reported in Tables 64 through 72. Four of the nine factors have significant F ratios and one is borderline. As has often been true, kindergarten and second grade were frequently the extreme groups. Kindergarten was high on Factor 1, Varied pupil initiated interaction, and 5, Extended teacher talk, which apparently represents a leisurely pace of teacher talk. It was low in Factor 6, Pupil talk. Apparently in kindergarten the teacher talked in more leisurely fashion, pupils initiated more often, but their total talk was less. Second grade was also high on Factor 1, Varied pupil initiated interaction, but contrasted in being high in Factor 6, Pupil talk. It was low in 3, Drill, and 9, Teacher pupil interaction in accepting climate. Apparently these second grade pupils initiated often, talked more, but interacted less with the teacher. Structured programs were not well represented in second grade, and this may be why drill was low. Entering first was sometimes separated from the other grades, being high in Factor 3, Drill, and Factor 9, Teacher pupil interaction in accepting climate, and low on Factors 1, Varied pupil initiated interaction and 5, Extended teacher talk. Apparently for these entering first grades, drill was high, but other kinds of teacher-pupil interaction were low, and pupils did not initiate much, but neither did the teacher talk at length.

Table 64

Multiple Range Test - Reciprocal Category System

Factor 1 - Varied Pupil Initiated Interaction vs Response to Teacher

Grade Level	Mean	NSR*	S.D.	N
Kindergarten	51.98		5.37	86
Second	51.21		6.45	45
Continuing First	49.23		5.85	91
Entering First	48.32		4.58	67

$F = 6.95 \quad p < .01$

*Non-significant range

Table 65

Multiple Range Test - Reciprocal Category System

Factor 2 - Teacher Response and Amplification

Grade Level	Mean	NSR*	S.D.	N
Kindergarten	51.54		6.43	86
Second	50.84		8.01	45
Continuing First	49.14		7.21	91
Entering First	49.01		7.34	67

$F = 2.38$

*Non-significant range

Table 66

Multiple Range Test - Reciprocal Category System

Factor 3 - Drill

Grade Level	Mean	NSR*	S.D.	N
Entering First	52.92		6.44	67
Continuing First	50.36	|	7.22	91
Kindergarten	48.34	|	7.26	86
Second	47.68	|	6.69	45

F = 7.24 $p < .01$

*Non-significant range

Table 67

Multiple Range Test - Reciprocal Category System

Factor 4 - Teacher Direction and Criticism vs Teacher Indirect

Grade Level	Mean	NSR*	S.D.	N
Continuing First	50.82	|	6.70	91
Second	50.49	|	6.62	45
Entering First	49.80	|	6.10	67
Kindergarten	49.21	|	6.16	86

F = 1.04

*Non-significant range

Table 68

Multiple Range Test - Reciprocal Category System

Factor 5 - Extended Teacher Talk

Grade Level	Mean	NSR*	S.D.	N
Kindergarten	51.44		7.28	86
Second	50.61		6.11	45
Continuing First	49.21		6.18	91
Entering First	48.46		6.09	67

F = 3.24 $p < .05$

*Non-significant range

Table 69

Multiple Range Test - Reciprocal Category System

Factor 6 - Pupil Talk

Grade Level	Mean	NSR*	S.D.	N
Second	52.71		8.44	45
Entering First	50.22		7.72	67
Continuing First	49.02		8.29	91
Kindergarten	48.85		8.21	86

F = 2.63

*Non-significant range

Table 70

Multiple Range Test - Reciprocal Category System

Factor 7 - Teacher Acceptance vs Teacher Correction

Grade Level	Mean	NSR*	S.D.	N
Entering First	50.13		7.28	67
Kindergarten	50.03		8.07	86
Second	49.95		7.96	45
Continuing First	49.70		7.77	91

F = 0.05

*Non-significant range

Table 71

Multiple Range Test - Reciprocal Category System

Factor 8 - Supportive Pupil Talk

Grade Level	Mean	NSR*	S.D.	N
Kindergarten	50.97		5.07	86
Entering First	50.52		6.64	67
Continuing First	50.27		5.64	91
Second	49.70		4.88	45

F = 0.55

*Non-significant range

Table 72

Multiple Range Test - Reciprocal Category System

Factor 9 - Teacher-Pupil Interaction in Accepting Climate

Grade Level	Mean	NSR*	S.D.	N
Entering First	52.26		5.95	67
Kindergarten	49.91	|	7.11	86
Continuing First	49.54	|	6.38	91
Second	46.96		7.06	45

$F = 5.90$ $p < .01$

*Non-significant range

Florida Taxonomy of Cognitive Behavior (COGTAX)

It seems likely that the data from which this instrument was coded may be the most restricted of all. It, and the Reciprocal Category System, were coded from audio tape, but since the RCS is only intended to deal with verbal interaction, presumably it is only slightly limited. It seems clear, however, that considerable amounts of activity at higher intellectual levels may occur in the classroom without being represented in verbal interaction. Further, it seems possible that classrooms which stress interaction between teacher and pupils might suffer less from this underrepresentation than classrooms in which pupils are more free to choose their activities, or work alone to a greater degree.

This factor analysis of the cognitive taxonomy differs somewhat from the previous ones in that the data tend to emerge by level to a considerably greater degree. The instrument is organized into seven levels in which the items represent increasing degrees of cognitive complexity and abstractness, and the factors from this analysis tend to group items together by level.

Factor 1 - Memory

Although there are few items in this factor (Table 73) the loadings are relatively heavy. All the items are from level 1 and represent memory activities. One negative loading occurred, for Median cognitive level for pupils, which contrasts these low level activities with higher level ones.

Factor 2 - Applying Previous Learning

The items are predominantly those of level 4, Application (Table 74). The essence of the application process is applying previous learning to a new situation, and the level 3 item, asks, gives reason, seems to fit this pattern. The other item which loads for pupils is the Median cognitive level, and since application is well above the typical level of classroom interaction the loading seems reasonable.

Factor 3 - Reading

This is a factor (Table 75) which does not follow the typical pattern of loading by level. Rather it appears to group items which differ in level of complexity, but which have reading in common.

Factor 4 - Naming

All the items in this factor come from the translation level, which involves translating experience and behavior into words and vice versa (Table 76). The factor might have been called translation, but was named as it was because of the higher loading for the item Names pictures, objects, color, letter.

Table 73

Taxonomy of Cognitive Behavior

Factor 1 - Memory

Teacher Item	Teacher Loading	Teacher Level	Description	Pupil Loading	Pupil Item
1	.71	1	Repeats from memory, repeats other, repeats in sequence	.82	34
2	.83	1	Choral response	.85	35
5	.78	1	Sum of memory	.82	38
			Median cognitive level	-.41	66

Eigenvalue = 5.35

Table 74

Taxonomy of Cognitive Behavior

Factor 2 - Applying Previous Learning

Teacher Item	Teacher Loading	Teacher Level	Description	Pupil Loading	Pupil Item
19	.52	3	Asks, gives reason	.50	52
26	.77	4	Asks, tells who, what, where, etc.	.75	59
27	.73	4	Applies previous learning to new situation	.74	60
29	.73	4	Sum of application	.74	62
33	.70		Median cognitive level	.55	66

Eigenvalue = 6.26

Table 75

Taxonomy of Cognitive Behavior

Factor 3 - Reading

Teacher Item	Teacher Loading	Teacher Level	Description	Pupil Loading	Pupil Item
6	.67	2	Sounds Letters	.65	39
10	.75	2	Recognizes word (sight reads)	.79	43
13	.79	3	Sounds out word	.79	46
28	.72	4	Reads	.73	61

Eigenvalue = 5.89

Table 76

Taxonomy of Cognitive Behavior

Factor 4 - Naming

Teacher Item	Teacher Loading	Teacher Level	Description	Pupil Loading	Pupil Item
7	.77	2	Names pictures, objects, color, letter	.77	40
9	.51	2	Reports experience (2+ thoughts)	.46	42
12	.63	2	Sum of translation	.65	45

Eigenvalue = 3.95

Factor 5 - Academic Skills

All the items in this factor come from level 3, Interpretation (Table 77). One of the two classes of behavior in this level is that of carrying out a previously learned task when asked to do so; the other is that of making comparisons. The first of these appears to be the major activity in the factor but the second is represented, too. Reading is a notable omission from this level, but appeared as a separate factor.

Factor 6 - Unnamed

This factor is unnamed because it is small but may have a common thread through the two items (Table 78). Creative activities are part of synthesis, and the comparisons may be part of art work, such as comparing colors, shapes or sizes.

Factor 7 - Classification

This factor spans levels of complexity again, but the two levels have to do with the same activity -- classification (Table 79). The negative loading for Performs learned task cannot be interpreted.

Factor 8 - Information Giving and Receiving

This is another factor (Table 80) which spans two levels of complexity but appears to represent a common activity, if asking permission and following directions are seen as seeking and receiving information about behavior. The level 1 activity here seems somewhat different in character than the level 1 activity in Factor 1, in that some minimum level of selecting relevant information appears to be involved here but absent from Factor 1, which principally involves repetition. The more complex activities of level 1 are grouped with level 2.

Intercorrelation between COGTAX factors - There were two correlations above .50 in COGTAX (Table 31-4, p. 63). Factor 4, Naming, correlated with Factor 8, Information giving and receiving. Since naming is giving information which is only slightly more complex than "information giving" the relation seems reasonable. Factor 5, Academic skills, correlated positively with Factor 6, Unnamed. Academic skills were all level 3 items, and one of the items was Makes comparison, which also occurred in Factor 6, apparently representing comparisons being made in activities such as art work. In general, correlations within COGTAX seem to be lower than for the other three instruments.

Relations between COGTAX and the other observation instruments - Correlations of the COGTAX factors with the other instruments were also generally lower, with none reaching .50, but with six in the 40's (Table 31-4, p. 63). COGTAX 1, Memory, correlated negatively with FLACCS 2, Pupil free choice, and TPOR 7, Exploration of ideas, but positively with RCS 3, Drill. COGTAX 3, Reading, related negatively with TPOR 5, Pupil free choice vs teacher structured activity, and TPOR 7, Exploration of ideas vs textbook learning, which means that reading is associated with teacher structured activity and textbook learning. It was also positively associated with RCS 3, Drill. All of these seem reasonable associations.

Table 77

Taxonomy of Cognitive Behavior

Factor 5 - Academic Skills

Teacher Item	Teacher Loading	Teacher Level	Description	Pupil Loading	Pupil Item
15	.74	3	Counts	.72	48
16	.68	3	Adds, subtracts, uses units, tens	.67	49
17	.48	3	Compares letters, numbers, copies letter (s), number (s). (learning)	.45	50
21	.47	3	Performs learned task or process	.42	54
22	.46	3	Makes comparisons	.48	55
23	.72	3	Sum of interpretation	.72	56

Eigenvalue = 5.57

Table 78

Taxonomy of Cognitive Behavior

Factor 6 - Unnamed

Teacher Item	Teacher Loading	Teacher Level	Description	Pupil Loading	Pupil Item
22	.56	3	Makes comparisons	.53	55
31	.55	6	Sum of synthesis	.58	64

Eigenvalue = 3.29

Table 79

Taxonomy of Cognitive Behavior

Factor 7 - Classification

Teacher Item	Teacher Loading	Level	Description	Pupil Loading	Pupil Item
14	.78	3	Classifies (1 attribute), gives class name (vehicle,etc.)	.77	47
24	.60	4	Classification (2+ attributes)	.64	57
21	-.42	3	Performs learned task or process	-.43	54

Eigenvalue = 3.64

Table 80

Taxonomy of Cognitive Behavior

Factor 8 - Information Giving and Receiving

Teacher Item	Teacher Loading	Level	Description	Pupil Loading	Pupil Item
3	.56	1	Gives, receives information	.57	36
4	.51	1	Seeks information	.47	37
8	.57	2	Gives, follows directions	.55	41
11	.51	2	Asks, gives permission	.48	44
12	.43	2	Sum of translation	.50	45

Eigenvalue = 3.86

Grade level differences for COGTAX - There were only four significant F ratios for discriminations between grade levels (Tables 81 through 88). Factor 3, Reading, was highest for entering first and lowest for kindergarten. Perhaps the high standing for entering first represents the more traditional, rural South, which may be "catching up." Second grade, which might be expected to be high, is probably not because less structured programs are involved. Factor 4, Naming, a relatively simple activity, was lowest for second grade. Academic skills put the grade levels in the order of entering first followed by continuing first, kindergarten, and second grade. These results parallel the high standing for entering first on Reading. Presumably the low position for second grade is again a function of underrepresentation of structured programs. Factor 6, Unnamed, but which involves creative activities, showed kindergarten highest.

Table 81

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 1 - Memory

Grade Level	Mean	NSR*	S.D.	N
Kindergarten	50.80		6.83	86
Continuing First	50.10		7.48	91
Entering First	49.19		9.30	67
Second	48.86		7.33	45

F = 0.87

*Non-significant range

Table 82

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 2 - Applying Previous Learning

Grade Level	Mean	NSR*	S.D.	N
Entering First	51.27		6.56	67
Second	50.55		6.27	45
Continuing First	50.06		7.29	91
Kindergarten	48.94		6.62	86

F = 1.57

*Non-significant range

Table 83

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 3 - Reading

Grade Level	Mean	NSR*	S.D.	N
Entering First	54.24		6.07	67
Continuing First	52.00	|	6.16	91
Second	50.25	|	5.40	45
Kindergarten	45.43		5.70	86

$F = 32.11$ $p < .01$

*Non-significant range

Table 84

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 4 - Naming

Grade Level	Mean	NSR*	S.D.	N
Entering First	50.92	|	7.07	67
Kindergarten	50.76	|	7.05	86
Continuing First	49.55	|	7.59	91
Second	46.79		8.45	45

$F = 3.46$ $p < .05$

*Non-significant range

Table 85

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 5 - Academic Skills

Grade Level	Mean	NSR*	S.D.	N
Entering First	51.60		5.85	67
Continuing First	50.86		6.65	91
Kindergarten	49.25		5.75	86
Second	48.25		6.27	45

$F = 3.69$ $p < .05$

*Non-significant range

Table 86

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 6 - Unnamed

Grade Level	Mean	NSR*	S.D.	N
Kindergarten	52.20		5.89	86
Continuing First	50.00		5.93	91
Entering First	49.76		6.26	67
Second	48.89		5.75	45

$F = 3.94$ $p < .01$

*Non-significant range

Table 87

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 7 - Classification

Grade Level	Mean	NSR*	S.D.	N
Entering First	50.36		5.49	67
Kindergarten	50.29		5.41	86
Second	50.14		5.68	45
Continuing First	50.10		6.33	91

F = 0.03

*Non-significant range

Table 88

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 8 - Information Giving and Receiving

Grade Level	Mean	NSR*	S.D.	N
Second	50.05		6.19	45
Continuing First	49.76		6.02	91
Entering First	49.69		4.84	67
Kindergarten	49.24		5.00	86

F = 0.25

*Non-significant range

Global Ratings and Classroom Description

As cited in the procedure section, at the beginning of the day observers filled out the first part of the Classroom Description -- items dealing with such stable aspects as numbers of pupils and adults, the physical characteristics of the classroom, size, etc. Then they spent a full day observing, using systematic observation instruments. After they had left the school at the end of the day, they completed the Global Ratings and the remainder of the Classroom Description which they could not have completed earlier -- such things as Structured time with the teacher, Time with meals and snacks, etc., which represented the entire day. It seems probable, then, that the ratings reported here are not comparable to ratings as they are customarily used. Rather than being based on a short observation period, they represent the pooled experience of two observers who have spent the day focused on specific behaviors as they have recorded them by systematic observation. It seems likely that this basis of experience might produce rather different results for the ratings than the usual procedure.

These two instruments were also reduced by factor analysis in order to reduce the number of variables involved, and these data are reported here. The interrelationships of the 37 individual measures from both of these instruments with the systematic observation instruments are shown in Appendix C.

Factor 1 - Informal vs Formal Classroom Organization - The positive pole of the factor (Table 89) represents pupil freedom, spontaneous emergence of pupil groups, differentiation, pupil involvement in reinforcing ways with material and other pupils, game-like activities and children's art work on display, in contrast to a formal furniture arrangement (rows), a high pupil/teacher ratio, and much time in structured activities with the teacher.

Factor 2 - Climate - The defining items (Table 90) are a positive emotional climate and happy-satisfied pupils, with pupil self control, reinforcement from adults, an accepting attitude of the teacher toward the observer, and moderate interest in him from the pupils. The description seems to be one of a happy, open, friendly place.

Factor 3 - Structured Learning Without the Teacher vs with the Teacher - In this case, the title seems to convey all the information in the factor (Table 91).

Factor 4 - Percent Nonwhite - Since ethnic group of the teacher was coded zero for nonwhite and one for white, the negatively signed item really indicated that the higher the proportion of nonwhite pupils and other adults, the greater the likelihood that the teacher was nonwhite. To a lesser degree, in this sample, big city classrooms tended to be nonwhite (See Table 92).

Factor 5 - Time vs Space - This factor represents total school hours vs space per child primarily (Table 93). Probably this is an entering first grade vs other grades factor, with the contrast greatest for kindergarten. Entering firsts tended to be rural and southern. Children were bussed distances, and followed the same schedule as the higher grades instead of having a shorter day (these data were collected in the winter of 1971). The region was less prosperous, and the classrooms tended to be smaller. As noted in the data from grade level

Table 89

Global Ratings and Classroom Description Measures

Factor 1 - Informal vs Formal Classroom Organization

Item	Loading	Description
1	.63	Pupil groupings
2	.52	Pupil differentiation
4	.49	Reinforcement from pupils
6	.57	Reinforcement from materials
8	.62	Pupil freedom
10	.48	Game-like activities
16	.40	Art work
21	.43	Number of interest centers
19	-.49	Classroom physical arrangement (formal = high)
31	-.45	Pupil/teacher ratio
32	-.42	Percent time structured with teacher

Eigenvalue = 3.93

Table 90

Global Ratings and Classroom Description Measures

Factor 2 - Climate

Item	Loading	Description
3	.46	Teacher voice inflection
5	.57	Reinforcement from adults
7	.69	Pupil self control
9	.41	Cognitive focus
11	.81	Positive-negative climate
12	.80	Pupils happy, satisfied
13	.61	Classroom attitude
15	.42	Attention to observers

Eigenvalue = 3.42

Table 91

Global Ratings and Classroom Description Measures

Factor 3 - Structured Learning Without the Teacher vs with the Teacher

Item	Loading	Description
26	.91	Hours of structured learning without teacher
33	.94	Percent time structured without teacher
25	-.45	Hours of structured learning with teacher
32	-.60	Percent time structured with teacher

Eigenvalue = 2.85

Table 92

Global Ratings and Classroom Description Measures

Factor 4 - Percent Nonwhite

Item	Loading	Description
22	.48	Community size
36	.69	Percent nonwhite pupils
37	.88	Percent nonwhite adults
18	-.70	Teacher ethnic group

Eigenvalue = 2.60

Table 93

Global Ratings and Classroom Description Measures

Factor 5 - Time vs Space

Item	Loading	Description
23	.83	Total school hours
25	.49	Hours of structured learning with teacher
28	-.53	Physical size of classroom
35	-.56	Space per child

Eigenvalue = 2.63

Table 94

Global Ratings and Classroom Description Measures

Factor 6 - Unstructured vs Structured Time

Item	Loading	Description
27	.83	Hours of unstructured time
34	.87	Percent time unstructured
25	-.50	Hours of structured learning with teacher
32	-.54	Percent time structured with teacher

Eigenvalue = 2.71

differences on the observation instruments, these classes tended to be more formally organized, and to concentrate on structured activities. In some ways, they give the impression of working "to catch up."

Factor 6 - Unstructured vs Structured Time - This factor (Table 94) represents the amount of time spent in unstructured activities as distinguished from the amount of time in structured activities (both with and without the teacher). It contrasts with Factor 3, in which structured learning was differentiated with respect to whether it was with or without the teacher.

It was not clear initially whether the data of the two instruments should be factored separately or together. The data were of different kinds, which argued for separate analyses; but the classroom description data was collected with the expectation that the physical characteristics of the classroom might make a difference in the activities that occurred there, or might reflect them. And this argued for a combined analysis. Although a combined analysis was carried out, the question turned out to have been largely academic. Only Factor 1 contained items from both instruments, and only four items "crossed" there. But, of course, in another sense that is meaningful information -- that process is apparently not greatly affected by setting, at least as the ratings reflected it.

It is interesting to note that of the six factors, four were classroom description data, one was rating data, and one contained both kinds of data. It may be that this reflects the criticism sometimes made of ratings that they tend to reflect relatively few sources of variance even when numbers of ratings are made. In contrast, the classroom description data were largely "counting" data, relatively objective and relatively unique.

Relations of Global Ratings and Classroom Description (GRCD) - The majority of the correlations are between the first two factors, which reflect rating data, and FLACCS and the TPOR (Table 95). Factor 1, Informal classroom organization correlated above .50 with FLACCS 2, Pupil free choice, TPOR 5, Pupil free choice, TPOR 7, Exploration of ideas, and RCS 1, Varied pupil initiated interaction. All of these have in common pupil freedom, activity, and interaction. Factor 2, Climate, which reflects a positive emotional climate, relates negatively to FLACCS 1, Strong control (which involved negative affect), and positively with FLACCS 9, Teacher positive affect. Factor 3, Structured learning without the teacher vs with the teacher seems interesting in the sense that it does not relate as strongly with the systematic observation measures as the previous factors. It relates in the .40's with FLACCS 2, Pupil free choice (apparently reflecting some freedom on the part of pupils working without the teacher). It also relates to TPOR 2, Experimental teaching, in which pupils make their collection and analysis of subject matter and find detailed facts and information on their own. It also relates to TPOR 5, Pupil free choice vs teacher structured activity. The negative poles of both factors (GRCD 3 and TPOR 5) represent work with the teacher. GRCD 3 also related to TPOR 7, Exploration of ideas vs textbook learning, which involves individual work by pupils as well as work with the teacher in the positive pole, and highly structured learning in the negative pole.

Table 95

Global Rating and Classroom Description Factors Related to Systematic Observation Factors

		IDNO	FAC1	FAC2	FAC3	FAC4	FAC5	FAC6
		1	2	3	4	5	6	7
IDNO	1	1.00	-0.03	-0.17	0.03	0.12	-0.13	0.07
FLX1	2	-0.01	-0.17	-0.59	0.13	0.13	-0.01	0.00
FLX2	3	0.05	0.74	0.01	0.41	-0.20	-0.43	0.56
FLX3	4	-0.02	0.38	0.15	0.32	-0.12	-0.12	0.25
FLX4	5	-0.18	0.12	0.13	-0.01	0.02	-0.04	0.01
FLX5	6	-0.19	0.06	0.28	0.05	-0.06	-0.01	-0.01
FLX6	7	0.08	0.10	-0.02	0.35	-0.09	0.02	0.18
FLX7	8	0.06	0.17	-0.45	0.30	0.07	-0.21	0.29
FLX8	9	0.10	0.17	0.04	-0.00	-0.03	0.04	-0.01
FLX9	10	-0.03	0.41	0.53	0.09	-0.22	-0.24	0.25
IDNO	11	1.00	-0.03	-0.17	0.03	0.12	-0.13	0.07
TPR1	12	-0.21	-0.40	0.01	-0.22	0.18	0.36	-0.44
TPR2	13	0.11	0.43	0.14	0.42	-0.10	-0.15	0.35
TPR3	14	0.03	-0.29	-0.17	-0.08	0.06	0.13	-0.22
TPR4	15	-0.10	-0.33	-0.08	-0.09	0.08	0.01	-0.21
TPR5	16	0.06	0.69	0.03	0.42	-0.23	-0.42	0.57
TPR6	17	0.01	-0.08	-0.17	0.17	-0.01	0.03	0.05
TPR7	18	0.03	0.65	0.08	0.44	-0.25	-0.29	0.49
IDNO	19	1.00	-0.03	-0.17	0.03	0.12	-0.13	0.07
RCS1	20	-0.02	0.51	-0.10	0.25	-0.18	-0.30	0.34
RCS2	21	0.07	0.28	-0.06	0.07	-0.17	-0.20	0.25
RCS3	22	-0.12	-0.32	0.30	-0.30	0.16	0.34	-0.34
RCS4	23	-0.07	-0.28	-0.04	-0.25	0.13	0.14	-0.19
RCS5	24	0.07	0.03	-0.03	-0.04	0.11	-0.09	-0.10
RCS6	25	-0.13	0.02	-0.07	0.11	-0.19	0.06	0.03
RCS7	26	0.01	0.11	0.24	0.06	-0.09	-0.01	0.02
RCS8	27	0.02	0.18	-0.12	0.15	-0.17	-0.14	0.16
RCS9	28	0.11	-0.00	0.24	-0.13	0.06	0.09	-0.10
IDNO	29	1.00	-0.03	-0.17	0.03	0.12	-0.13	0.07
COG1	30	-0.24	-0.34	0.16	-0.27	0.13	0.10	-0.30
COG2	31	0.01	0.04	0.17	0.01	-0.05	0.09	-0.01
COG3	32	0.08	-0.31	0.07	-0.10	-0.02	0.38	-0.26
COG4	33	0.04	0.08	0.11	0.06	-0.03	-0.01	0.13
COG5	34	0.03	-0.12	0.19	-0.20	0.16	0.12	-0.15
COG6	35	0.03	-0.01	0.13	-0.07	-0.02	-0.12	-0.03
COG7	36	-0.08	-0.01	0.00	0.04	0.03	-0.07	-0.05
COG8	37	0.04	0.07	0.01	0.12	-0.10	-0.07	0.15

It is interesting to note that Factor 4, Percent nonwhite pupils and adults does not have a correlation as large as .3 with any observation measure. Apparently, the process measures from these four observation instruments are independent of the ethnic composition of the classroom. Factor 5, Time vs space, had a moderate negative correlation with FLACCS 2, Pupil free choice, probably as a function of the longer days and more structured procedures of entering first grade classrooms. It also correlated moderately negatively with TPOR 5, Pupil free choice. Factor 6, Unstructured vs structured time, related positively above .5 with FLACCS 2, Pupil free choice, and TPOR 5, Pupil free choice, and above .4 with TPOR 7, Exploration of ideas, but negatively (.4) with TPOR 1, Convergent teaching. Most of the correlations of GRCD are with FLACCS and TPOR; there is only one with RCS above .4 and none with COGTAX. It is also interesting that the factors from the GRCD which relate to the systematic observation measures are primarily the first two, which represent pupil freedom and classroom emotional climate, but with generally lower correlations for the factors reflecting structuring of the classroom. The factors reflecting time, space and ethnicity scarcely related to the observational measures.

Grade level differences for Global Ratings and Classroom Description - Grade level differences for these instruments are shown in Tables 96 through 101. Kindergarten is high on Factor 1, Informal organization and 6, Unstructured time, and low on 5, spending less time in school and having more space. Entering first grade is high on Factor 5, indicating more time and less space, and low on 4, percent nonwhite. Nonentering first grade is high on percent nonwhite and low on climate, both perhaps reflecting the big city influence.

Summary of relations between all the instruments - The major amount of overlap occurs between the FLACCS and the TPOR, which seems surprising since they have no common theoretical base. They are, however, the two instruments which were used "live" in the classroom. The degree of overlap that does exist between RCS and the two live instruments seems impressive in the sense that the coder had never seen the classroom and only knew it through what he heard through earphones. The Cognitive Taxonomy is the most independent of the instruments, which would be expected since the domain it records is unique. The rating and classroom description data overlap primarily with FLACCS and the TPOR, with the Cognitive Taxonomy almost completely unrelated.

The ratingsproduced only two rather broad factors representing relative freedom of pupils and emotional climate, which often related with the systematic observation data. In contrast, the classroom description data produced four factors which were less related to the systematic observation factors, but two of these representing the structuring of the classroom showed modest but reasonable relationships with other observation measures.

Overall, when factors relate, the reasonableness of the relationship seems compelling. Pupil free choice, for example, as different instruments reflect it, interrelates as would be expected. FLACCS factors identify the affective, personal side of the intellectual activities identified by the TPOR.

Table 96

Multiple Range Test - Global Ratings and Classroom Descriptions

Factor 1 - Informal vs Formal Classroom Organization

Grade Level	Mean	NSR*	S.D.	N
Kindergarten	51.81		4.60	86
Second	49.24	|	5.63	45
Entering First	49.07	|	5.12	67
Continuing First	48.96	|	5.46	91

$F = 5.74$ $p < .01$

*Non-significant range

Table 97

Multiple Range Test - Global Ratings and Classroom Descriptions

Factor 2 - Climate

Grade Level	Mean	NSR*	S.D.	N
Entering First	51.32	|	5.52	67
Kindergarten	50.28	| |	6.33	86
Second	49.52	|	7.12	45
Continuing First	48.52	|	6.01	91

$F = 2.86$ $p < .05$

*Non-significant range

Table 98

Multiple Range Test - Global Ratings and Classroom Descriptions

Factor 3 - Structured Learning Without the Teacher vs with the Teacher

Grade Level	Mean	NSR*	S.D.	N
Second	50.99	|	9.79	45
Entering First	50.25	|	6.74	67
Continuing First	50.13	|	9.18	91
Kindergarten	49.47	|	6.76	86

F = 0.37

*Non-significant range

Table 99

Multiple Range Test - Global Ratings and Classroom Descriptions

Factor 4 - Percent Nonwhite

Grade Level	Mean	NSR*	S.D.	N
Continuing First	51.88	|	6.34	91
Kindergarten	50.57	| |	6.26	86
Second	48.84	|	6.50	45
Entering First	47.18	|	5.18	67

F = 8.45 $p < .01$

*Non-significant range

Table 100

Multiple Range Test - Global Ratings and Classroom Descriptions

Factor 5 - Time vs Space

Grade Level	Mean	NSR*	S.D.	N
Entering First	55.27		5.39	67
Second	51.77	|	6.04	45
Continuing First	51.30	|	5.69	91
Kindergarten	43.86		7.00	86

$F = 48.34$ $p < .01$

*Non-significant range

Table 101

Multiple Range Test - Global Ratings and Classroom Descriptions

Factor 6 - Unstructured vs Structured Time

Grade Level	Mean	NSR*	S.D.	N
Kindergarten	52.53		8.73	86
Entering First	49.25	|	6.60	67
Second	48.92	|	8.23	45
Continuing First	48.73	|	8.39	91

$F = 3.99$ $p < .01$

*Non-significant range

Discriminations made by the instruments - In the previous section, interrelationships between the factor scores from the instruments have been presented and discussed as one way of understanding the nature of each instrument and its contribution to the total observation data. Another aspect of the instruments is the ability of each factor to discriminate between groups. Discriminations between grade levels have been presented and discussed already, but discriminations between the experimental programs fielded by different sponsors have also been calculated. These data are available in detail ~~only for limited distribution~~ (Appendix E). They are summarized, however, along with the grade level discrimination data in Table 102.

The results as a whole indicate the power of these observational and rating measures to discriminate between groups. A total of 39 factors were analyzed out of the six instruments (four systematic observation instruments, one rating scale, and one classroom description), of which 32 discriminated between experimental programs at the one percent level of significance, and one discriminated at the five percent level. Of the remaining six factors, three discriminated significantly between grade levels, leaving three which failed to discriminate in either case -- all in the Cognitive Taxonomy. These data are especially relevant since the reliability data on the instruments which are cited later are inadequate in some ways, and these data help to fill the gaps.

Every factor from FLACCS discriminated significantly. The one which discriminated only at the five percent level was Factor 1, Strong Control, which was one of the major factors from the instrument, and had high reliability. Probably the reason for the lower significance level in this case is that the behavior it represents would be minimized by all sponsors.

From the TPOR, six of the seven factors discriminated between sponsors at the one percent level, but the seventh, which did not discriminate, was the sixth, Unnamed, factor. The curious thing about it is that this factor did discriminate between grade levels, as well as showing a significant interaction in the analyses of high and low control teachers at three points in time, a discussion which follows. Apparently, it contains minimal reliable variance whose meaning is obscure.

All nine of the factors from the RCS discriminated between experimental programs at the one percent level. This degree of power from data coded by someone who only knows the classrooms from what he hears on tape seems surprising.

The Cognitive Taxonomy appears to be the weakest instrument in the battery, so far as power to discriminate between programs is concerned, although its first factor, Memory, showed one of the largest F ratios of any of the factors for discrimination between programs, and Factor 3, Reading, showed one of the largest F ratios between grade levels. Altogether, three factors discriminated between programs -- two discriminated grade levels at the one percent level, and two more discriminated grade levels at the five percent level. Three of its eight factors make no significant discriminations and are the only factors from the entire 39 for whom that is true. There may be several possibilities for the weakness shown by this instrument. It is the most abstract and

Table 102

Multiple Range Tests for all Instruments by Grade and Sponsor[1]

Factor Description	Grade Homogeneous Subsets	Grade F	Sponsor Homogeneous Subsets	Sponsor F
Florida Climate and Control System				
1. Strong Control	2	3.10*	2	2.08*
2. Pupil Free Choice vs No Choice	2	5.28**	4	28.79**
3. Teacher-Pupil Supportive Behavior	1	.25	4	4.34**
4. Nonverbal Gentle Control	1	.39	2	3.27**
5. Gentle Control	2	3.17*	4	4.95**
6. Work Without Teacher	2	9.16**	4	4.60**
7. Pupil Negative Affect	1	1.63	3	4.03**
8. Teacher Attention in a Task Setting	2	2.38	3	6.09**
9. Teacher Positive Affect	2	2.99*	3	2.98**
Teacher Practices Observation Record				
1. Convergent Teaching	2	5.81**	5	15.55**
2. Experimental Teaching	2	2.97*	5	10.91**
3. Teacher Discourages Exploration	2	2.45	3	4.80**
4. Undifferentiated Teaching	2	4.50**	3	15.04**
5. Pupil Free Choice vs Teacher Structured Activity	2	8.23**	7	28.91**
6. Unnamed	2	3.67*	1	1.08
7. Exploration of Ideas vs Textbook Learning	2	3.00*	6	47.65**
Reciprocal Category System				
1. Varied Pupil Initiated Interaction vs Response to Teacher	3	6.95**	4	17.85**
2. Teacher Response and Amplification	2	2.38	4	4.69**
3. Drill	3	7.24**	4	23.52**
4. Teacher Direction and Criticism vs Teacher Indirect	1	1.04	3	6.14**
5. Extended Teacher Talk	2	3.24*	3	2.75**
6. Pupil Talk	2	2.63	3	2.59**
7. Teacher Acceptance vs Teacher Correction	1	.05	3	3.63**
8. Supportive Pupil Talk	1	.55	3	3.60**
9. Teacher-Pupil Interaction in Accepting Climate	3	5.90**	3	3.91**
Taxonomy of Cognitive Behavior				
1. Memory	1	.87	5	27.31**
2. Applying Previous Learning	1	1.57	1	0.80
3. Reading	3	32.11**	3	7.62**
4. Naming	2	3.46*	2	1.48
5. Academic Skills	3	3.69*	3	4.53**

Table 102 - Continued

Factor Description	Grade		Sponsor	
	Homogeneous Subsets	F	Homogeneous Subsets	F
Taxonomy of Cognitive Behavior - Continued				
6. Unnamed	2	3.94**	1	1.31
7. Classification	1	.03	2	1.20
8. Information Giving and Receiving	1	.25	1	1.17
Global Ratings and Classroom Description Measures				
1. Informal vs Formal Classroom Organization	2	5.74**	4	25.41**
2. Climate	2	2.86*	3	4.43**
3. Structured Learning Without the Teacher vs with the Teacher	1	.37	4	7.06**
4. Percent Nonwhite	3	8.45**	2	6.28**
5. Time vs Space	3	48.34**	4	5.71**
6. Unstructured vs Structured Time	2	3.99**	4	8.56**

[1] N = 289 classrooms

*p < .05

**p < .01

inferential instrument and the most difficult one to train observers in, and to use. It probably loses considerable information from having been taken from tape rather than observed live, since any cognitive activity which was not expressed verbally would have been missed. Considerable portions of the materials used in these experimental classrooms are intended to support individual pupil cognitive activity. Still another possibility may be that the domain of the cognitive level of interaction has received less attention in teacher preparation programs and sponsors' programs than the social-emotional and organizational variables represented by the other three systematic observation instruments, so that differences are smaller. But even though the instrument is clearly a weaker one than the others, as it has been used in this project, the relations between measures make clear that it is the most unique and perhaps is justified for inclusion on the basis that it provides information not tapped anywhere else in the battery.

Every factor from the GRCD discriminated programs at the one percent level, and only one factor failed to discriminate between grade levels. If the instruments are seen as representing two classes of variables, one representing social-emotional and organizational aspects of the classroom, the other "setting" variables, such as city size, classroom size, length of the school day, etc., both classes of variables discriminated significantly, both between grade levels and between programs.

Taken as a whole, the battery of classroom measures appears to discriminate rather powerfully between both grade levels and experimental programs, which argues both for the reliability of the measures and for their usefulness as program descriptors.

Study of Teacher Behavior at Three Points in Time

As was described in the procedure section, two subsets of teachers were selected from the previous winter's sample to be observed at the opening of school, late fall, and during the winter. These subsets were selected as high and low control teachers on the basis of the FLACCS factor that most nearly represented strong control. Ten high and ten low control teachers were identified initially, but one teacher was lost from one group and two from the other as a consequence of a teacher strike. Three additional teachers were lost because of scheduling difficulties (teacher illness the day of the observation, etc.) after the observers were out in the field. The lost teachers were replaced the day scheduled but, of course, no previous data were available for these three. These teachers were observed the first week of school, again in late October, then again as part of the winter sample.

The fall data were normed from the T-score distributions for the total winter group. A first analysis of the data was done omitting these replacement teachers, with the finding that differences on FLACCS 1 approached significance, but did not reach it. Since a central interest was examination of differences associated with differences in control techniques, the teachers were reclassified, pooling fall data on control with previous year data on control, giving the three replacement teachers a mean rank for the previous year. Analysis of all measures was then carried out.

Differences between teachers on the observation measures - The data from the fall observations were reduced by the same factor scoring procedures as the winter sample. Then the factors were analyzed by a two-factor analysis of variance with repeated measures in which differences between high and low control teacher groups were one factor, and the points in time the other. The results for the analyses which showed significant differences are reported in Table 103.

FLACCS factors - As noted above, the F ratios for Factor 1, Strong Control, based on the previous year's classification were not significant, although they were in the expected direction (Table 103). When the analysis was run on the total group, classified on both year's data, the difference between high and low control teachers was highly significant, as would be expected, but the difference has uncertain meaning, since the test was based in part on the classification. Both groups of teachers decreased significantly in the amount of strong control exercised over the three time periods. Although the interaction did not reach significance, most of the decrease occurred in the high control subgroup. At the winter observation, this high control group of teachers was scarcely above the mean for the winter group of teachers and would not, at that point, have been selected as a high control subgroup. One reason for the decrease in strong control by high control teachers may be that knowing they were part of a small subgroup being observed more frequently than others may have led to change in their behavior. Samph's (1968) data indicated that criticism of pupils was one aspect of a teacher's behavior that changed significantly when she knew she was being observed, in contrast to a recording of her behavior made without her knowledge.

Significant differences between groups and over time were also observed for FLACCS 6, Work Without the Teacher. More work without the teacher occurred in low control classrooms than high, showing that in low control classrooms, pupils work independently more often. In both sets of classrooms, work without the teacher increased at the second observation, and at the third returned to nearly the same level as at the beginning of the year. Several other factors showed this same pattern of change. One possibility may be that six of the teachers in this substudy were from Philadelphia, where winter observations began, so that they were observed the second week after Christmas vacation. It seems possible that some reorganizing and beginning new units of study may have occurred then, paralleling the organizing at the beginning of the year.

FLACCS 7, Pupil Negative Affect, showed significant decrease over time for both groups but no significant difference between groups nor any interaction. Apparently teachers using the different control styles represented were equally successful at reducing negative pupil affect as the school year progressed.

Significant differences between groups were observed on FLACCS Factor 9, Teacher Positive Affect, with low control teachers expressing more positive affect. Although there was a tendency toward increasing positive affect for all teachers over time, it was not significant.

TPOR factors - TPOR Factor 1, Convergent Teaching, showed a higher mean for high control teachers than low, which seems reasonable. Even so, they were below the mean for the winter sample. Factor 4, Undifferentiated teaching,

Table 103

Significant Differences for High and Low Control Teachers at Three Points in Time

	Factor		Means by Time 1	2	3	F	Control High	Low	F	Interaction F
FLACCS	1[a]	Strong Control	51.1	48.9	48.2	2.48	51.6	47.2	2.59	.37
	1	Strong Control	52.1	49.8	48.5	4.51*	54.2	45.6	34.63**	1.99
	6	Work Without Teacher	49.3	53.1	50.7	4.09*	46.5	56.2	12.49**	.40
	7	Pupil Negative Affect	54.8	53.2	49.7	6.95**	53.0	52.1	.17	1.05
	9	Teacher Positive Affect	50.2	50.4	52.8	1.82	47.5	55.2	10.97**	.10
TPOR	1	Convergent Teaching	46.2	47.7	45.4	2.37	48.6	44.0	4.98*	1.76
	4	Undifferentiated Teaching	50.3	47.9	50.4	2.41	53.6	44.9	7.78**	.56
	5	Pupil Free Choice vs Teacher Structured Activity	53.3	54.6	53.0	2.12	51.5	56.1	4.10	5.25*
	6	Unnamed	47.8	49.0	49.6	1.72	49.5	48.1	1.97	6.20**
	7	Exploration of Ideas vs Textbook Learning	52.0	54.3	53.5	3.08	50.7	56.2	12.73**	.28
RCS	4	Teacher Direction and Criticism vs Teacher Indirect	52.0	52.6	49.3	1.62	54.3	48.0	26.56**	1.93
	7	Teacher Acceptance vs Teacher Correction	42.7	43.8	50.8	10.73**	41.4	50.6	21.19**	.17
COGTAX	2	Applying Previous Learning	56.4	56.8	50.9	3.44*	54.7	54.6	0.00	1.84
GRCD	6	Unstructured vs Structured Time	57.3	57.7	50.7	6.72**	50.7	60.3	3.20	2.25

[a]Based on previous year's classification

*$p < .05$ **$p < .01$

was significantly higher for high control teachers than low. It seems reasonable that it would be harder to exercise control over a number of activities than a few.

TPOR 5, Pupil Free Choice vs Teacher Structured Activity, showed a highly significant interaction, with high control teachers showing an increase in Pupil free choice from the first to second observation, with the new level maintained at the third observation, whereas low control teachers maintained a higher level of Pupil free choice for the first two observations which declined considerably by the third. Apparently the high control teacher started with a somewhat tighter structure which was soon relaxed, whereas the low control teacher permitted more pupil choice in the beginning, which became structured more slowly

TPOR 6, which was unnamed, showed a highly significant interaction, based mainly on an extremely low score for low control teachers at the first observation. At the second and third observations, the low and high control groups were quite similar. This finding is uninterpretable since the meaning of the factor is not clear.

A highly significant difference between groups was found for TPOR 7, Exploration of Ideas vs Textbook Learning, with higher scores on the factor for low control teachers, which seems reasonable. There was a trend toward greater exploration of ideas for both groups at the second observation, which was not significant.

RCS factors - There were fewer significant differences for RCS than for the systems used in "live" observation. RCS Factor 4, Teacher Direction and Criticism vs Teacher Indirect, showed a highly significant difference between groups, with greater criticism for high control teachers. There was also a slight trend for criticism to decrease over time, which paralleled the finding for FLACCS 1, Strong Control, but in this case the trend was not significant.

Factor 7, Teacher Acceptance vs Teacher Correction, showed significant change over time as well as a significant difference between groups. Low control teachers accepted more, or corrected less, than high control teachers, and both groups of teachers accepted more or corrected less as time passed. This result also appears to parallel that for FLACCS 1.

COGTAX factors - Only one factor from the Cognitive Taxonomy had a significant F ratio -- that was Factor 2, Applying Previous Learning. The two groups were virtually identical, and the first two observations were very similar, but the mean for the third observation dropped essentially to the mean for the winter sample. Apparently the higher fall scores reflected reviewing and reference to earlier work as the year's work got underway, but dropped to the rate typical of new learning by the winter observation.

GRCD factors - GRCD 6, Unstructured vs Structured Time, did not differ significantly between the high and low control subgroups, but the decline in unstructured time (increase in structure) was significant across the three observations. Although the interaction did not reach significance, the low control subgroup actually increased in unstructured time at the second observation, but showed a sharp drop at the third observation. This finding agrees with TPOR 5, Pupil Free Choice vs Teacher Structured Activity, in showing an increase in structure at the third observation for low control teachers.

Summary of differences - In summary, low control teachers exercised less strong control in comparison with high control teachers; they also had more pupil work without the teacher and expressed more positive affect. They did less convergent teaching, differentiated more, and encouraged greater exploration of ideas. They directed and criticized less and showed greater acceptance. All of these appear to be reasonable differences between groups of teachers selected on the basis of differences in the coerciveness of the control methods they used.

With respect to changes over time, strong control by the teacher, expression of pupil negative affect, application of previous learning (perhaps reviewing), and pupil unstructured time decreased, and teacher acceptance increased. Several other measures were different on the second observation from the first and third; work without the teacher and pupil free choice were higher at the second observation; along with a trend for greater exploration of ideas which was not significant. Undifferentiated teaching was also lower at this point, meaning that differentiation was higher as work without the teacher and pupil free choice were higher. The possibility was suggested that a number of the teachers in the subsample were observed the second week after Christmas, so that the similarity of first and third observations may represent a "recycling" or beginning a new phase of work.

There were two significant interactions: one was not interpreted since the factor was unnamed; the other suggested that high control teachers started with little pupil freedom and increased it, whereas low control teachers started with high pupil freedom and decreased it.

Stability and Reliability of Observation Measures

In the previous section, change in the observation measures over time was analyzed. In a sense the obverse of the question of change is the question of stability, that is, we can examine the extent to which teachers remain in the same order on a measure, recognizing that the mean for the group could have shifted without affecting the correlation. In addition to the question of stability of measures, the question of reliability of observers will be examined.

Stability - The correlations for each of the classroom measures for the three points in time are shown in Table 104.

FLACCS - The data indicate that FLACCS 1 was relatively stable over the three observations. There is a suggestion for it, which is common for a number of factors, for any two adjacent times to relate more highly than the correlation of the first and third observation, suggesting a continuing reordering of the teachers throughout the time of this substudy. For FLACCS 2, Pupil Free Choice, the second and third, and first and third observations correlated at a similar but lower level than the first and second, suggesting greater change in order between the second and third observation. FLACCS 6, Work Without the Teacher, on the other hand, correlated more highly between the first and third observation than either of the other two. This finding parallels the differences between means at three points in time, in which the first and third observations were similar, but the second differed somewhat. This agreement appears to support the interpretation of teachers "cycling" through phases of classroom organization. FLACCS 7, Pupil Negative Affect, correlated moderately between adjacent observations, but from the first to the third the correlation was essentially zero, suggesting a continuing rearrangement of classrooms so that middle of the year behavior could not be predicted from beginning of the year behavior. This lack of stability for pupil affective behavior seems a surprising finding. Teacher expression of affect does remain relatively stable, but apparently pupil affect does not. The fact that pupil change appears to be a continuing process in the classroom suggests that the teacher may have an influence which is not immediate, and the teacher behavior which is related must be different from the control style identified as high and low control since pupil negative affect declined similarly for those two teacher groups.

FLACCS 9, Teacher Positive Affect, is another relatively stable factor, approximately as stable as Strong Control, but with a suggestion of a gradual change over time. These two factors represent teacher positive and negative affect, and represent a portion of the data leading to the expectation that pupil affect should also be stable. Earlier work (Soar, 1966) showed that observations of teacher and pupil negative affect made during the winter a year apart correlated about .6, even though different pupil groups were involved. These data, taken together, suggest that teacher affective behavior is stable, and that a similar stable level of pupil behavior is created by the middle of the school year, but that pupil affect expression changes throughout the fall. Apparently the influence of the teacher on pupil negative affect expression is not immediate.

Table 104

Correlations Between Observations at Three Points in Time

Factors	Observation Periods 1,2	1,3	2,3
Florida Climate and Control System			
1. Strong Control	.77	.58	.72
2. Pupil Free Choice vs No Choice	.77	.48	.54
3. Teacher-Pupil Supportive Behavior	.47	.19	-.05
4. Nonverbal Gentle Control	.45	.24	.23
5. Gentle Control	.27	.30	-.22
6. Work Without Teacher	.77	.89	.66
7. Pupil Negative Affect	.51	.09	.54
8. Teacher Attention in a Task Setting	-.16	.18	-.23
9. Teacher Positive Affect	.67	.55	.71
Teacher Practices Observation Record			
1. Convergent Teaching	.61	.59	.69
2. Experimental Teaching	.26	.33	.55
3. Teacher Discourages Exploration	.32	-.02	.50
4. Undifferentiated Teaching	.75	.85	.78
5. Pupil Free Choice vs Teacher Structured Activity	.86	.62	.78
6. Unnamed	-.23	.19	.01
7. Exploration of Ideas vs Textbook Learning	.78	.53	.72
Reciprocal Category System			
1. Varied Pupil Initiated Interaction vs Response to Teacher	-.07	-.15	.44
2. Teacher Response and Amplification	.31	.19	.02
3. Drill	.38	.61	.31
4. Teacher Direction and Criticism vs Teacher Indirect	.20	.15	.02
5. Extended Teacher Talk	.21	-.03	.37
6. Pupil Talk	-.07	.23	-.05
7. Teacher Acceptance vs Teacher Correction	.61	.57	.42
8. Supportive Pupil Talk	-.11	.01	.02
9. Teacher-Pupil Interaction in Accepting Climate	-.18	.20	.33
Taxonomy of Cognitive Behavior			
1. Memory	.17	.03	.38
2. Applying Previous Learning	.45	-.19	.26
3. Reading	.48	.35	.13
4. Naming	-.12	.44	-.19
5. Academic Skills	.13	.07	.44
6. Unnamed	-.12	.19	.29
7. Classification	.12	-.06	.65
8. Information Giving and Receiving	.24	.52	-.02

Table 104 - Continued

Factor	Observation Periods 1,2	1,3	2,3
Global Ratings and Classroom Description Measures			
1. Informal vs Formal Classroom Organization	.87	.78	.76
2. Climate	.57	.70	.65
3. Structured Learning Without the Teacher vs with the Teacher	.74	.37	.25
6. Unstructured vs Structured Time	.85	.64	.74

TPOR - Factor 1, Convergent Teaching, was relatively stable with the first and third correlation about as high as either of the other two, suggesting variability or unreliability, but no consistent trend for change among the teachers.

TPOR 4, Undifferentiated Teaching, also showed a stable pattern. Factors 5 and 7, Pupil Free Choice and Exploration of Ideas, which have shown similar patterns in other analyses, continued to do so in these data, showing a decrease in correlation across longer time intervals.

RCS - The RCS factors showed less stability than either of the instruments used in live observation, perhaps reflecting again the loss in information involved in working from tape. Factor 3, Drill, showed a moderately high correlation between the first and third observations, with the other relations low. Perhaps this reflects the "recycling" effect again. RCS 7, Teacher Acceptance, showed modest stability, but none of the others did.

COGTAX - The interrelations across the three time periods seem too low for the Cognitive Taxonomy to indicate enough stability to be worthy of much attention. Factor 7, Classification, showed modest stability from the second to the third observation, and Factor 8, Information giving and receiving, from the first to the third. But these are measures whose reliabilities were low, and the patterns do not appear to contribute to understanding. Probably they are better regarded as the variabilities to be expected from a small sample.

GRCD - Two factors which represented such stable aspects of the classroom as time, space, and numbers of adults and pupils were omitted from this analysis. Two of the remaining four factors showed relatively high relationships across time periods. Factor 1, Informal vs Formal Classroom Organization and 6, Unstructured vs Structured Time, both appear to reflect the pervasive teacher-structure, pupil-freedom dimension cited earlier. Factor 2, Climate, was comparatively stable, but appeared to be less so than the two just cited. This contrasts with the Pupil Negative Affect (FLACCS 7) which showed little stability over three periods, but Climate is a much broader factor. Factor 3, Structured Learning Without the Teacher vs with the Teacher, was relatively stable across the first two observations, but not the others. Perhaps pupil work without the teacher becomes better organized later in the year.

The pattern of relationships across all the instruments and the three periods of time are not generally high, indicating considerable variability of teacher behavior across occasions, even though the analyses of variance did not show large numbers of significant differences. It seems likely that teacher-pupil data would be more variable from activity to activity within a given day than from day to day when the entire day is pooled, as was the case here. The generally higher video and audiotape reliabilities reported in Table 105, page 127, in comparison to these data just cited, appear to support the suggestion that variability of teacher behavior is a greater source of variance than observer agreement.

Reliability - Medley and Mitzel (1963) and McGaw, Wardrop, and Bunda (1972) have pointed to the need to differentiate observer agreement from stability of teacher behavior, suggesting that lack of agreement between observers is probably a minor source of variability compared to variability of teacher behavior when the objective is to obtain a measure of "typical" teacher behavior. Toward separating these questions, limited data were collected to examine the question of observer agreement. The observers who collected data live all observed a video tape of one teacher before beginning the winter observation, and a tape of another teacher at the end of their field work. The data from these observations were analyzed by Hoyt's (1955) analysis of variance formula "5" to obtain a reliability coefficient which was then extended by the Spearman-Brown procedure to estimate the reliability of a full day's observation. For the RCS and COGTAX data, varying subgroups of coders coded tapes from four teachers, and the data were also analyzed by the same analysis procedure to obtain reliability coefficients.

The collection of adequate reliability data from classroom settings raises some difficult practical problems which are rarely discussed, which become even more difficult when a two-person observation team is involved. In theory, the ideal solution for collecting reliability data would be to have all observers in the same classrooms at the same time. With 14 observers, this is out of the question. A less difficult possibility would be to have two teams of two observers present in each of a series of classrooms during the collection of data. The collection of an adequate amount of data by this procedure would eliminate half of the observers from data collection toward the major project objectives some period of time, and doubles travel costs for that period. Sending a third observer rather than duplicating a complete team slows the accumulation of data and extends it further, so that no saving results. But the critical problem is the effect on the classroom of increasing the number of observers. One observer represents a threat to many teachers and a distraction to the children, at least initially, and as the number of observers increases, these difficulties increase, probably more like a geometric function than an arithmetic one. Three observers seem appreciably more a problem than two, and we have not been willing to try sending four.

For all of these reasons, the decision was made to collect reliability data from video tape rather than live. But this substitutes a new set of problems. Observing a classroom by means of the typical video tape is like looking through a keyhole -- the view is very narrow. This probably has two effects on reliability -- the small number of behaviors available for viewing, in contrast to the diversity of an entire classroom, should probably have the effect of increasing their reliability of observation materially. But at the same time, the great majority of the behaviors in the classroom will not be available for viewing, and any measure which includes them will have its variability restricted in proportion to the number of these items. In addition, virtually all video tape focuses on the teacher to the exclusion of the pupils, or at most gives a limited view of a small number of children with the teacher. For classrooms as diverse as Follow Through classrooms, this is a gross underrepresentation of the activity actually occurring.

Video tape seems to be becoming the standard method of assessing reliability of classroom observation because of its convenience and its practical advantages. But its limitations need to be recognized. Almost surely the behaviors which focus on a teacher directing the activities of a small group of pupils will be reflected in spuriously high reliabilities, and the reliabilities of all other behaviors will be spuriously low. The results which follow reflect both effects, and need to be considered in relation to earlier results on discrimination of programs and grade levels. Those data probably underrepresent reliability as well, since the groups examined are not likely to be homogeneous, but to the extent that they indicate greater evidence of reliability than the explicit reliability data do, their evidence should be considered.

Large amounts of video tape were screened seeking tapes in which pupil behavior was more prominent, and the tapes used were the most representative that were found, but they still displayed a relatively "teacher front and center" style of teaching, which meant that several of the measures showed the teachers to be very much alike. Since analysis of variance reliability basically compares variance between observers with variance between teachers, several of these measures showed negative reliabilities, which meant that variance between observers was greater than between teachers. Since these figures depart from the usual meaning of reliability, they are not reported. In three out of four of these cases, variability between observers was not larger than for other measures which were highly reliable. The unusually small variability between teachers was the difficulty. These reliability coefficients are shown in Table 105.

Since the classroom description data would not be expected to suffer from problems of reliability (measures such as physical size of the classrooms and numbers of pupils and adults), reliabilities have not been estimated for the GRCD factor scores. The ratings, however, whose reliability is of interest, were recorded separately for each classroom by each member of the observation team, and these reliabilities are reported in Table 106. Two reliability estimates are reported for each rating; one is the correlation between the two raters, which would be relevant to the use of the ratings by a single observer, the other is a Spearman-Brown estimate of the reliability of the pooled ratings used in further analyses.

The reliabilities for the FLACCS and the TPOR (Table 105) are generally high; probably some are spuriously high for the reasons cited above. Of the four omitted reliabilities, FLACCS 3, Teacher Pupil Supportive Behavior, has a number of items which are only likely to occur in informal settings with relatively free interaction between pupils. Factor 4, Nonverbal Gentle Control, represents rather fleeting, nonverbal behavior, and it may be that the teachers really did not differ, or the observation of the factor may simply have been unreliable. Factor 6, Work Without the Teacher, is one of the clearest examples of a factor whose items could not have been checked in the video taped teacher central segment, since all of these items represent pupils who are working without the teacher. Factor 8, Teacher Attention in a Task Setting, largely represents teacher attention to individuals, which is excluded from being coded when the teacher is central. FLACCS 5, Gentle Control, has the lowest of the reliabilities reported for that instrument, but represents subtle behavior which is easily missed. The rest of the factors have good reliability.

Table 105

Analysis of Variance Reliabilities for the Observation Measures

Factor	Reliability
Florida Climate and Control System	
1. Strong Control	.99
2. Pupil Free Choice vs No Choice	.89
3. Teacher-Pupil Supportive Behavior	--
4. Nonverbal Gentle Control	--
5. Gentle Control	.77
6. Work Without Teacher	--
7. Pupil Negative Affect	.99
8. Teacher Attention in a Task Setting	--
9. Teacher Positive Affect	.98
Teacher Practices Observation Record	
1. Convergent Teaching	.99
2. Experimental Teaching	.99
3. Teacher Discourages Exploration	.74
4. Undifferentiated Teaching	.82
5. Pupil Free Choice vs Teacher Structured Activity	.90
6. Unnamed	.48
7. Exploration of Ideas vs Textbook Learning	.99
Reciprocal Category System	
1. Varied Pupil Initiated Interaction vs Response to Teacher	.84
2. Teacher Response and Amplification	.66
3. Drill	.55
4. Teacher Direction and Criticism vs Teacher Indirect	.76
5. Extended Teacher Talk	.97
6. Pupil Talk	.75
7. Teacher Acceptance vs Teacher Correction	.82
8. Supportive Pupil Talk	.80
9. Teacher-Pupil Interaction in Accepting Climate	.80
Taxonomy of Cognitive Behavior	
1. Memory	.99
2. Applying Previous Learning	.87
3. Reading	.99
4. Naming	.92
5. Academic Skills	.97
6. Unnamed	.67
7. Classification	.56
8. Information Giving and Receiving	.64

Table 106

Reliability of Global Ratings[1]

	r Between Observers	Pooled Reliability*
Pupil Groupings	.75	.86
Pupil Differentiation	.66	.80
Teacher Voice Inflection	.45	.62
Reinforcement from Pupils	.42	.59
Reinforcement from Adults	.45	.62
Reinforcement from Materials	.47	.65
Pupil Self Control	.53	.69
Pupil Freedom	.65	.79
Cognitive Focus	.52	.68
Game-like Activities	.54	.70
Positive-Negative Climate	.58	.73
Pupils Happy, Satisfied	.51	.68
Classroom Attitude	.46	.63
School Attitude	.63	.77
Attention to Observers	.44	.61
Art Work	.77	.87
Room Displays	.82	.90

[1]N = 289 classrooms

*Spearman-Brown adjusted

There was other evidence to indicate that the FLACCS reliabilities which were omitted were at least significantly reliable. All four of them discriminated significantly between experimental programs (Table 102), with probabilities beyond the one percent level. Presumably, this would occur only occasionally, and as a chance occurrence, if the measure did not have significant reliability. The fact that all four were significant indicates that they were probably reliable despite their failure in the analysis of variance based on viewing video tapes.

The TPOR factors generally had satisfactory to good reliability. Factor 3, Teacher Discourages Exploration, is lower than most and may represent behaviors which occurred infrequently in both tapes. On the other hand, it does require rather fine discriminations. Factor 6 was the Unnamed factor and may reflect a gathering of unreliable items. The remainder of the factors have good reliability. There is support in Table 102 for the significance of the reliability of all of the TPOR factors as discriminators between programs paralleling that cited for FLACCS.

The RCS factors had reliabilities that ranged from questionable to good. Factor 3, Drill, had the lowest reliability, and that seemed surprising since it appeared to involve a relatively obvious, clear-cut set of behaviors. Factor 2, Teacher Response and Amplification, was the other factor with questionable reliability; there is sometimes uncertainty about the transition from the teacher's amplification of a pupil idea to her presentation of her own, and this difficulty may be a factor.

The reliabilities of the COGTAX were generally surprisingly high. The abstract nature of the coding task, and the difficulties of training coders had led to the expectation that reliabilities would be relatively low. The reliabilities of the last three factors were low enough to indicate questionable usefulness. Factor 6 was Unnamed, but the other two factors appeared to involve behavior which would be as easy to identify as that in the more reliable factors. Probably an issue in the relative size of all the coefficients is the variability between teachers on the particular items involved. If the items were coded with high consistency but the teachers differed little, the reliability would be low. On the other hand, the relatively high reliabilities for the latter two instruments which were obtained despite the limited information available to the coder, probably reflects the diversity of the teacher group being coded.

The data do illustrate the inadequacy of presenting reliability in terms of observer agreement for a total instrument, which is common. The RCS data, for example, indicate that reliabilities of separate measures ranged from indicating doubtful value to ones that were quite high. To cite one overall value for the instrument as a whole does not seem to be useful.

Combined Analyses Across All Observation Instruments

Analyses performed on the observation data to this point have examined differences between grade levels and programs, one dimension of behavior at a time. Although each of these dimensions represents a considerable amount of data, each represents only a narrow view of classroom behavior, and broader view seems useful. One attempt to increase the breadth of view has been multiple coding, another has been to identify "sequences of instructional events" (Rosenshine & Furst, 1973, p. 167), but this procedure is necessarily limited to category systems such as the Flanders System, in which data are recorded sequentially. Sign systems and rating scales could not be treated in this way.

Another way to increase the breadth of view of the classroom would be to group teachers who hold similar positions on a number of measures; that is, who show similar patterns or profiles of behavior, and examine the nature of these patterns. Such a procedure also appears to offer a means of examining the extent to which teachers from each of the experimental programs tend to be grouped in the same profile. This is the approach taken in this study.

After the completion of the separate factor analyses of the five instruments, the items which loaded most heavily on each factor of each instrument were selected for further analysis. Several analyses were tried in exploratory fashion.

Since these are all procedures for grouping people rather than measures, they are all limited in the number of people to be analyzed, just as the usual factor analysis is limited in the number of measures which can be analyzed simultaneously. As a consequence, it seemed wise to limit the analyses to a single grade. The nonentering first grade sample (91 classrooms) was selected for these further analyses over kindergarten, the other large sample, since it seemed more representative of school settings in general.

Transpose Factor Analysis of Distances

The first analysis applied as a way of grouping teachers (and programs) on multiple variables was Guertin's distance (d) analysis (Guertin & Bailey, 1970; Guertin, 1971), which is a transpose factor analysis of the d statistic. In the results cited to this point in this report, factor analysis has been used as a way to group the observational data into a smaller number of measures which are more reliable and less redundant. What factor analysis, in its usual form, does, is to group measures which are highly related into factors. A parallel statement would be that it puts together into one factor measures which create similar profiles across people. Another variant of factor analysis, called transpose analysis, takes its name from the fact that the roles of people and measures are transposed from those of traditional factor analysis, so that what the analysis does, in effect, is to factor people rather than measures. That is, it groups people who have similar

profiles across measures, rather than grouping measures which have similar profiles across people, as the usual factor analysis does. The traditional form of factor analysis is labeled "R" Analysis, and transpose factor analysis as "Q" analysis.

The usual transpose factor analysis uses correlations (between people, rather than between measures) as the basic data for analysis, just as R analysis does. Guertin's analysis differs from the usual Q analysis in that it uses the distance statistic (d) (Cronbach & Gleser, 1953) as the basic data for analysis. This measure is the square root of the sum of the squared differences between all the measures being analyzed for each possible pair of persons. For example, if individual A and individual B are to be compared on 10 measures, the difference between measure 1 for the two people is taken, and squared; the difference between measure 2 for each of the two is taken and squared; and so on until all 10 differences have been taken. The squared differences are then summed, and the square root taken. This result is the d for individuals A and B. Similarly, if 10 people are to be studied, a matrix can be built up of the differences of each person and each other person, so that a 10 x 10 matrix of d's is constructed. For the distance analysis, as Guertin has developed it, each value in the matrix of distances is subtracted from the largest value in the matrix, then divided by the largest value so that the scale ranges from zero to one, and larger numbers represent greater similarity. The resulting matrix is then factored by principal components extraction followed by varimax rotation, parallel to the analysis which would be done with correlations. The result is a series of groupings of individuals in which the differences among the members of each group are at a minimum. As an example of this analysis, Guertin has shown that his d analysis correctly classified all of a sample of different classes of ships on the basis of measurements taken from Jane's Fighting Ships, whereas transpose analysis of correlations, the usual procedure, produced factors which failed to represent all of the types of ships clearly.

The results of the distance analysis are shown in Table 107. Factor 1 includes the largest number of teachers of any of the factors--indeed a significant proportion of the total number of teachers. Several programs have a large majority of their teachers loading heavily on this factor--Program 1, Program 5, and Program 7. Factor 2 contains half the teachers from Program 2 and only one or two from most of the other programs. Factor 3 contains five out of six teachers from Program 3, three out of ten from Program 1, three out of nine from Program 6, and only a scattering from other programs. Factor 4 contains six out of ten teachers from Program 2, which also was heavily represented on Factor 2, ten out of 18 from Program 9 and only a scattering from the other programs. When additional factors were rotated, they consisted of only three or four teachers, again scattered across programs.

This analysis would be interpreted the same way the usual R analysis would be--that is, one is told which measures are grouped together on a given dimension, but inferring the nature of the dimension

Table 107

Distance Analysis by Program

Program	Teacher	Factor 1	2	3	4	Program	Teacher	Factor 1	2	3	4
1	1	61			65	5	5	60			
	2	50		50	51		6	84			
	3	77					7	83			
	4			76			8	50			
	5	53		55			9			61	
	6		51				10	76			
	7	63	51				11	52			
	8	88									
	9	60				6	1			72	
	10				62		2				60
							3				54
2	1				66		4				57
	2		85				5			60	
	3		87				6			53	
	4		78				7		60		
	5		61		51		8				58
	6				66		9	51			
	7		54								
	8				69	7	1			58	
	9				58		2	65			50
	10				65		3	89			
							4	74			
3	1			63			5	59			
	2	52		57			6	93			
	3	78					7	75			
	4	54		62			8	72			
	5		58	58			9	71			
	6			63							
						8	1		65		
4	1						2				
	2			72			3			61	
	3				64		4				
	4	63					5			67	
	5	71					6		72		
	6						7				54
	7		62				8	68			
	8	56			57		9				
							10	56			
5	1	73									
	2	93				9	1		59		
	3	65		52			2	51			
	4	65					3				53

Table 107 Continued

Program	Teacher	Factor 1	2	3	4
9	4				78
	5				71
	6				72
	7				67
	8				81
	9	74			
	10				70
	11				69
	12	56	51		
	13		52		
	14	52		58	
	15				62
	16			50	
	17				69
	18				

requires knowledge of the measures grouped on it. Similarly, interpreting the d analysis requires knowledge of the people being grouped, so it is little help in clarifying the nature of programs. The information that can be drawn from it without additional analysis is the relative degree to which teachers from the same programs group together, and programs fall into different groups. Although clusterings by programs do appear to a degree, the process is far from complete. Perhaps this is not surprising, when the comparison is being made on 76 items, and the items are not specially selected to represent the individual programs, but rather to maximize differences between teachers.

Profile Analysis of Items

Since the groupings from the d analysis appeared rather coarse, and since information about the basis for the grouping appeared to be desirable, Guertin's Profile Analysis (Guertin, 1966; Guertin & Bailey, 1970) was applied to the same set of 76 items. These results consisted frequently of relatively small groups of teachers which were identified as having similar profiles, and the profiles were typically identified by 20 or 30 items on which this group of teachers deviated by more than a standard deviation from the mean of the total group. Interpretation of these results was difficult, in the sense that a great deal of information was presented for assimilation. The problem appeared to be one of finding a suitable compromise between the amount of information retained and the difficulty of interpretation.

Factor Analysis of High Loading Items

As an approach toward reducing the complexity of the profile analysis output, the 76 items drawn from previous analyses were subjected to R analysis. (Another alternative would have been a second-order factor analysis of the factor scores from the five instruments. We have carried out this procedure on several occasions earlier, and in each case it has appeared to combine such large amounts of data that the meaning was essentially destroyed. Factors which had separately discriminated between programs and related to the growth of pupils, when subjected to second order factor analysis produced results which had neither of these validity characteristics.)

As might be expected, the data from this combined R analysis appeared to be somewhat more complex than that from individual observation instruments, and a larger number of factors (11) were required to represent what appeared to be the clearest structure.

Factor 1 - Teacher-Pupil Positive Interaction - The strongest loadings in the factor suggest interaction between teacher and pupils, but not interaction which is directed by the teacher (Table 108). Rather, the teacher responds, and a variety of kinds of sequences of teacher-pupil interaction occur. These interactions are supported by positive affect, expressed by both teacher and pupils, teacher amplifi-

Table 108

All Process Instruments

Factor 1 - Teacher-Pupil Positive Interaction

Loading	Instrument	Description
.42	FLACCS	Total teacher positive affect
.43	FLACCS	Total pupil positive affect
.47	RCS	Teacher amplifies
.67	RCS	Teacher responds
.61	RCS	Teacher-pupil flexibility
.47	RCS	Pupil initiation following teacher indirect
.44	GRCD	Pupil freedom
-.41	RCS	Pupil-pupil talk

Eigenvalue = 3.50

cation of pupil ideas, and freedom for pupils. The factor appears to be summarized by three concepts--interaction, pupil freedom, and positive affect. Three instruments are represented, FLACCS, RCS, and the Global Rating-Classroom Description data.

Factor 2 - Teacher-Pupil Negative Affect Versus Positive Climate - The highest loading (Table 109) is that for teacher negative affect, followed by the teacher using a threatening tone and the most strongly coercive level of teacher verbal control (which includes negative affect used in the exercise of control). Other data indicate pupil resistance to following directions, expression of negative affect by pupils, and teacher criticism. The negative pole of the factor reflects a positive climate, pupil self-control and teacher acceptance. This factor is drawn from four of the five observation instruments, with only data from the Cognitive Taxonomy omitted. It appears to represent a classroom in which the teacher is using the harshest methods available to her to maintain control, but not being very successful.

Factor 3 - Teacher Asks Hard Question, Pupils Mull - The highest loading for the factor reflects the teacher giving pupils time to sit, think, and mull things over, supported by another item which reflects the teacher leading the pupil to a question which "stumps" him (Table 110). At the same time, it is clear that this is a "hard-headed" process in which the teacher helps pupils discover and correct errors, but does it in a gentle, indirect fashion so that pupils often initiate. There is a minor loading for the teacher inviting application, a relatively complex level of cognitive activity. So the pattern appears to be one in which teacher and pupils are involved in higher level cognitive interaction, in which pupils think, mull, and initiate, but the teacher assists them in a gentle way to correct their errors. Three instruments are represented, the TPOR, the RCS, and the Cognitive Taxonomy.

Factor 4 - Gentle Teacher Control and Support - The highest loadings for the factor represent gentle teacher control, apparently primarily nonverbal (Table 111). Additional items reflect teacher support of the child and pupil agreement with one another. Nothing in the factor indicates whether this is behavior occurring in a cognitive setting, and all of the items come from one instrument, FLACCS.

Factor 5 - Pupil Counts, Adds, Interpretation and Memory - As the title suggests, the three heaviest loadings reflect counting, adding and subtracting, and interpretation (Table 112). The first two items fall within the level of interpretation so that the factor appears to reflect primarily numerical activity, but secondarily, perhaps, teacher work with pupils on any previously learned task. The lower loadings for memory and Level 2 (gentle) verbal control probably reflect supporting activities in the cognitive work. The factor is taken primarily from the Cognitive Taxonomy, but with FLACCS contributing as well.

Table 109

All Process Instruments

Factor 2 - Teacher-Pupil Negative Affect vs Positive Climate

Loading	Instrument	Description
.66	FLACCS	Pupil resists, disobeys directions
.77	FLACCS	Level 5, teacher verbal control
.76	FLACCS	Teacher uses threatening tone
.84	FLACCS	Total teacher negative affect
.70	FLACCS	Total pupil negative affect
.60	TPOR	Teacher imposes external disciplinary control on pupil
.50	RCS	Teacher cools, formalizes
-.45	RCS	Teacher acceptance-rejection, percent
-.61	GRCD	Pupil self control
-.77	GRCD	Positive-negative climate

Eigenvalue = 5.76

Table 110

All Process Instruments

Factor 3 - Teacher Asks Hard Question, Pupils Mull

Loading	Instrument	Description
.65	TPOR	Teacher leads pupil to question, "stumps" him
.67	TPOR	Teacher helps pupil discover and correct factual errors and inaccuracies
.73	TPOR	Teacher gives pupil time to sit and think, mull things over
.57	RCS	Teacher accepts
.57	RCS	Pupil initiation following teacher indirect
.44	Cog Tax	Teacher sum of application

Eigenvalue = 3.93

Table 111

All Process Instruments

Factor 4 - Gentle Teacher Control and Support

Loading	Instrument	Description
.53	FLACCS	Level 1, teacher verbal control
.62	FLACCS	Level 1, teacher nonverbal control
.71	FLACCS	Level 2, teacher nonverbal control
.53	FLACCS	Teacher supports child
.43	FLACCS	Pupil agrees with another

Eigenvalue = 3.35

Table 112

All Process Instruments

Factor 5 - Pupil Counts, Adds, Interpretation and Memory

Loading	Instrument	Description
.46	FLACCS	Level 2, Teacher verbal control
.48	Cog Tax	Teacher-sum of memory
.67	Cog Tax	Teacher-sum of interpretation
.65	Cog Tax	Pupil counts
.67	Cog Tax	Pupil adds, subtracts

Eigenvalue = 3.68

Table 113

All Process Instruments

Factor 6 - Teacher-Pupil Translation

Loading	Instrument	Description
.85	Cog Tax	Teacher-sum of translation
.82	Cog Tax	Pupil-sum of translation
.43	RCS	Drill

Eigenvalue = 2.86

Factor 6 - Teacher-Pupil Translation - This factor (Table 113) reflects teacher and pupil activity at the second cognitive level--translation, which represents translation of ideas from one form to another, without changing or adding to them. Such activities as sounding letters, identifying letters or numbers, or recognizing words would fall in this level. The item "drill" appears to fit rather naturally. Two instruments are represented, the Cognitive Taxonomy and the RCS.

Factor 7 - Divergent Versus Convergent Teaching - This factor represents a high level of pupil talk on one pole of the factor--initiating and interrupting (Table 114). Along with this, the teacher encourages the pupil to guess, hypothesize, or suggest alternative answers, and the teacher's questions are broad. The other pole of the factor, in contrast, is one in which the teacher expects the pupil to come up with the "right" answer, after which the teacher reinforces it immediately. The teacher exercises external disciplinary control, the pupil responds to the teacher and has no choice in what he does or how he does it. This factor represents four instruments, omitting the rating instrument.

Factor 8 - Teacher Indirect Versus Criticism - The nature of this factor is not as clear as some of the others (Table 115), but the positive pole appears to reflect indirect teacher behavior in a relatively orderly classroom (the latter suggested because a higher than average number of interactions could be understood well enough from audio tape to be coded). In contrast, the negative pole represents criticism by both teacher and pupils, along with pupil directions. In this context, the teacher broad question could be a question such as "Why did you do that?" or "What are you doing?" This factor is made up entirely of items from the Reciprocal Category System.

Factor 9 - Teacher Central Versus Pupil Selected Activity - This factor (Table 116) appears to parallel one which has appeared repeatedly in FLACCS and TPOR data--that of the extent to which the teacher is central in the activity of the classroom. At one pole, the teacher selects the task, the pupils have no choice in what is to be done or how it is to be done, they wait, watch and listen, they all work at the same task at the same time and are evaluated by the same standards. This is clearly a task-oriented classroom, as evidenced by the amount of structured learning time with the teacher, and the learning activities are at a relatively high cognitive level. In contrast, the other pole of the factor represents a classroom in which pupils have considerable freedom in what is done and how it is done. It is an active, informally operating classroom. Four of the five instruments are represented in the factor, with only the Reciprocal Category System not appearing.

Factor 10 - Teacher Uses Text, Prevents Ambiguity - This factor apparently represents a classroom in which procedures are largely "cut and dried", with much of the activity being previously packaged (Table 117). It seems somewhat similar in flavor to the negative pole of Factor 7, which was characterized as convergent teaching. The differences suggest that the negative pole of Factor 7 is one in which the teacher is concerned with "right" answers and is exercising close control

Table 114

All Process Instruments

Factor 7 - Divergent vs Convergent Teaching

Loading	Instrument	Description
.57	TPOR	Teacher permits pupil to suggestion additional or alternative answers
.50	TPOR	Teacher encourages pupil to guess or hypothesize about the unknown or untested
.69	RCS	Pupil initiates
.53	RCS	Teacher broad question
.63	RCS	Total pupil interruption
.41	RCS	Steady-state teacher initiation
.51	Cog Tax	Pupil gives, receives information
-.46	FLACCS	Pupil no choice
-.64	TPOR	Teacher expects pupil to come up with answer teacher has in mind
-.46	TPOR	Teacher immediately reinforces pupil's answer as "right" or "wrong"
-.41	TPOR	Teacher imposes external disciplinary control on pupil
-.65	RCS	Student response to teacher

Eigenvalue = 6.05

Table 115

All Process Instruments

Factor 8 - Teacher Indirect vs Criticism

Loading	Instrument	Description
.47	RCS	Teacher acceptance-rejection, percent
.67	RCS	Teacher revised I/D
.82	RCS	Total number of tallies for all observations (raw)
-.46	RCS	Teacher cools, formalizes
-.57	RCS	Teacher broad question
-.66	RCS	Pupil direction and criticism

Eigenvalue = 3.42

Table 116

All Process Instruments

Factor 9 - Teacher Central vs Pupil Selected Activity

Loading	Instrument	Description
.59	FLACCS	Teacher central
.43	FLACCS	Pupil no choice
.72	TPOR	Teacher has pupil spend time waiting, watching, listening
.60	TPOR	Teacher organizes learning around question posed by teacher
.46	TPOR	Teacher has all pupils working at same task at same time
.40	TPOR	Teacher evaluates work of all pupils by a set standard
.53	GRCD	Hours of structured learning with teacher
.44	Cog Tax	Teacher-sum of application
-.61	FLACCS	Pupil free choice
-.41	FLACCS	Pupil uses play object as itself
-.53	TPOR	Teacher makes doing something center of pupil's attention
-.44	TPOR	Teacher approaches subject matter in an indirect, informal way
-.52	GRCD	Pupil freedom

Eigenvalue = 5.65

Table 117

All Process Instruments

Factor 10 - Teacher Uses Text, Prevents Ambiguity

Loading	Instrument	Description
.67	TPOR	Teacher prevents situation which causes pupil doubt or perplexity
.56	TPOR	Teacher steers pupil away from "hard" question or problem
.64	TPOR	Teacher relies heavily on textbook as source of information
.46	TPOR	Teacher immediately reinforces pupil's answer "right" or "wrong"
.41	TPOR	Teacher evaluates work of all pupils by a set standard
-.46	GRCD	Total school hours

Eigenvalue = 3.54

Table 118

All Process Instruments

Factor 11 - Structured Activities Without the Teacher

Loading	Instrument	Description
.77	FLACCS	Pupil seatwork without teacher
.48	FLACCS	Pupil uses play object as itself
.71	FLACCS	Structured groups without teacher
.46	FLACCS	Pupil agrees with another
.61	GRCD	Hours of structured learning without teacher

Eigenvalue = 3.45

over the behavior of pupils. In contrast, in this factor, no items reflect management of behavior but an organization of subject matter in which exploration or examination of uncertainties is prevented. In the former case, pupils are in interaction with the teacher, whereas in the latter, materials appear to be more central. The positive pole of the factor is made up entirely of items from the TPOR, the single item on the negative pole, although from the Global Rating-Classroom Description data, does not seem strong enough to enter the description.

Factor 11 - Structured Activities Without the Teacher - The highest loadings in the factor appear to represent individual seatwork, and small group work, both carried out without the teacher (Table 118). This interpretation is supported by the third item, hours of structured learning without the teacher. This factor is primarily a FLACCS factor, with one item from the Global Rating-Classroom Description Data.

With respect to this factor analysis as a whole, the factors appear to vary in the extent to which they represent several instruments. There are five factors which represent several instruments relatively strongly. On the other hand, two factors are made up completely of one instrument each, with four more made up predominantly of one instrument but with minor representation by another. The Cognitive Taxonomy appears strongly in two factors (primarily made up of items from itself), but it appears in only minor ways in other factors. On the other hand, the Global Rating-Classroom Description data appear to play a relatively minor role throughout the analysis, but the other three instruments, FLACCS, TPOR, and RCS seem to support each other in giving meaning to numbers of factors.

The procedure of taking high loading items from initial factor analyses for another factor analysis seems to have produced a relatively clear, easily interpretable set of factors which appear subjectively to describe classrooms meaningfully. They seem a promising set of reduced measures for the profile analysis, as well as being of interest in themselves.

Profile Analysis of Factor Scores

Having reduced the data from 76 items to 11 factor scores, we were ready to reapply the profile analysis procedure. Since the results from this analysis seem worthy of discussion, the procedure itself will be discussed here.

Previous discussion of transpose factor analysis (Q analysis) has indicated that it takes its name from the fact that people and measures have their roles transposed from those of the more common R factor analysis. Rather than grouping measures which create similar profiles across people (that is, that are correlated), as R analysis does, Q analysis groups people who show similar profiles across measures.

An analysis of distances has been reported earlier, in contrast to the procedure of factoring correlations which is usual in Q analyses. But since the profile analysis utilizes information about both correlation and distance, successively, clarification of the effects of both seems worth attempting. An illustration of the position of four individuals (A through D) on four scales is shown in Figure 7. Profiles A, B, and D are of similar shape, that is the high and low points are associated with the same tests. The Q analysis of correlations would be expected to group those three measures together, since they have similar shapes. (This insensitivity of correlations to differences in level, as in A and D, led Guertin to develop his d analysis, utilized earlier.) On the other hand, Profiles A, B, and C are quite similar for level, that is the distances between the scores on each test are relatively small, compared to the total distances, which would also involve distances from D. As a consequence, the d analysis would be expected to group profiles A, B, and C together because of their similar level, although A and B would be shown as more similar to each other than C would be to either one of them.

The profile analysis procedure (Guertin, 1966; Guertin and Bailey, 1970) utilizes both of these analyses in order first to identify profiles which are similar in shape; but then, among those which are similar for shape, to identify those which are similar in level. To follow the example of Figure 7, the Q analysis of correlations which is the first step in the profile analysis would identify individuals A, B, and D as belonging to the same shape family, and would represent them in one factor. Then, that one factor is carried forward to another stage of analysis in which the d analysis is applied to separate these results further into as many patterns (levels) as appeared to be warranted. In that stage of the analysis, profiles A and B would be retained as making up one pattern, and profile D would be dropped because of its distance from the other two (a minimum of two heavily loading profiles, or three moderately loading ones, is required to establish a pattern). The output of the analysis, finally, then, is a series of profiles which are similar first for shape (shape families) and then for level (patterns).

This result contrasts with the factor analyses (R analysis) whose results figure largely in this report. Those analyses identify a series

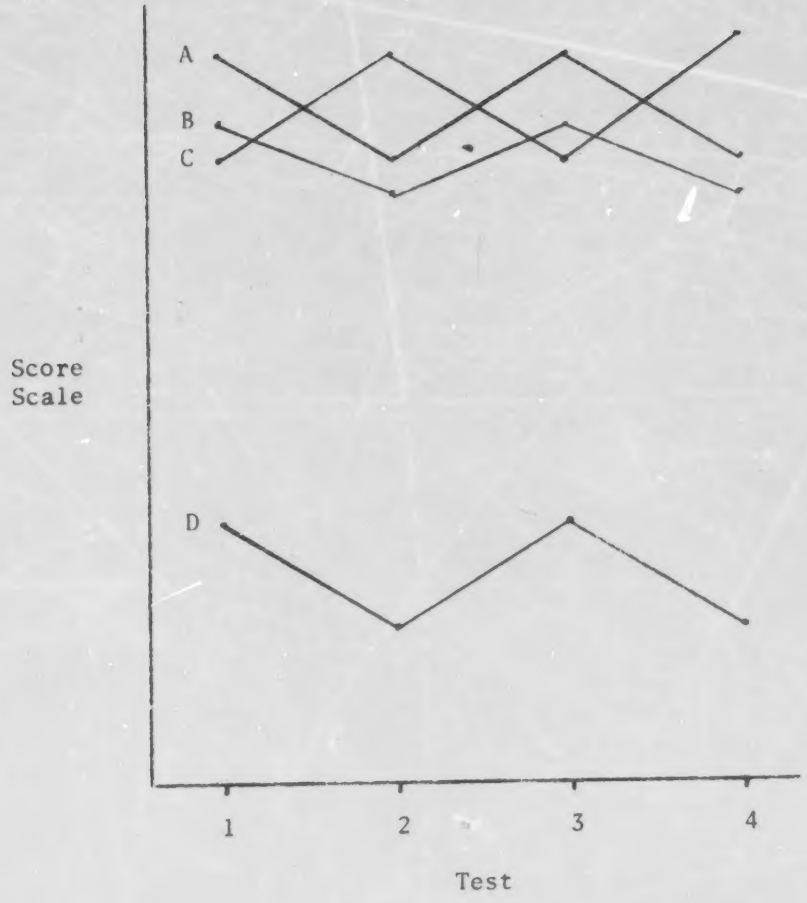


Figure 7. The Distinction Between Shape and Level as Characteristics of Profiles

of dimensions of behavior which run through the observational data and along which teachers (or programs) are scaled, but they do not perform the further task of examining similarity of position on two or more dimensions. This is what the profile analysis does.

Since the R analysis reduced the number of data points in each profile to 11 it became possible to graph profiles for examination. These factor scores appeared to be a reasonable compromise between interpretability and loss of information (in contrast with the earlier analysis of items), so these are the results which are presented.

If the whole series of profiles is scanned (Figures 8 through 19), they appear to vary from a case in which the differences between profiles is almost entirely one of level--Shape Family 7 is probably the clearest example of this, followed by Shape Families 12 and 10--to other profiles in which the differences appear not to be in overall level, but variations in pattern around a common trend. As examples, Shape Family 6 appears to be a series of variations around a common pattern, as do Families 4 and 8. Most of the others appear to follow this latter pattern to a considerable degree. Again, to clarify, the Shape Family is the group of teachers identified by one factor in the Q analysis of correlations (or one pole of such a factor if it is bipolar), and the Patterns are subgroups within that factor which have been identified by a distance analysis.

Shape Family 1 - Patterns 1 and 3 appear to be variations on a common theme, but Pattern 2 appears to differ somewhat (see Figure 8). Patterns 1 and 3 have in common relatively high levels of gentle teacher control, slightly below average amounts of mid-level cognitive interaction and high levels of structured activity without the teacher. Pattern 3 adds a relatively high level of teacher-pupil negative affect (which also includes strong teacher control). The contrast between these two patterns is an interesting one, in which both have relatively high levels of gentle teacher control, but one has teacher-pupil negative affect at a high level, and the other does not.

Pattern 2 appears to deviate more widely, being slightly below average for teacher-pupil positive interaction, and considerably lower for the two factors representing cognitive interaction and divergent teaching. The surprising aspect of this pattern is its similarity to Pattern 1 of Shape Family 2 (Figure 9). Examination of the output of the Q analysis, however, shows one teacher common to the two Shape Families, but with none of the other loadings at all similar.

Shape Family 2 - The common trend appears to be one showing peaks for teacher-pupil negative affect, and for activity in which the teacher is central, and low points for positive interaction and T Asks Hard Question (Figure 9). The variation within the family shows one pattern very high in translation level cognitive activities, another pattern very low on the same dimension, with the third pattern at an intermediate level; and smaller differences in use of "packaged" activities. So the family appears to be one in which negative affect and teacher central activities are common but with major differences in the use of the lower and middle levels of cognitive interaction.

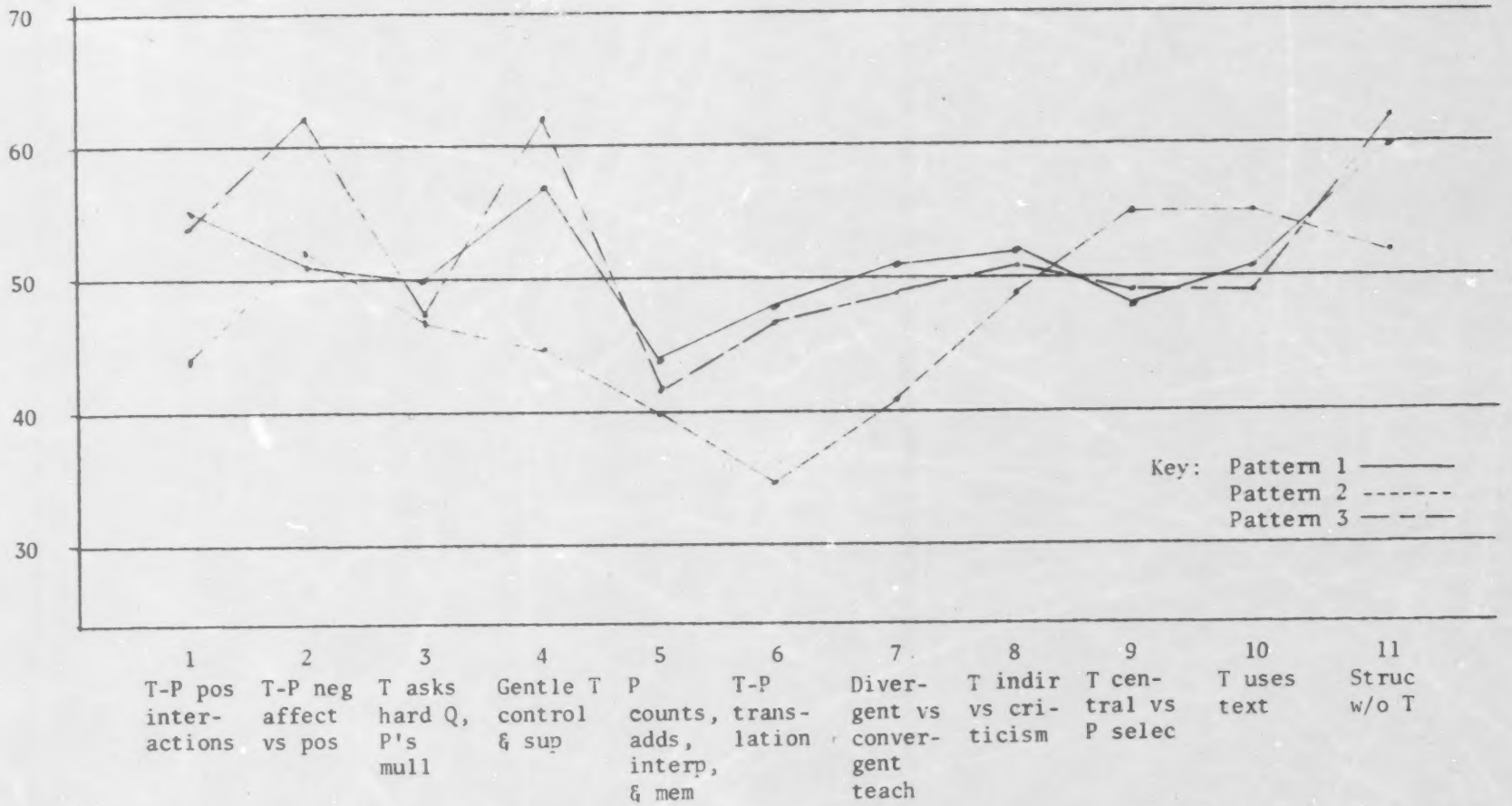


Figure 8 : Profile Analysis of Five Instruments
Shape Family 1

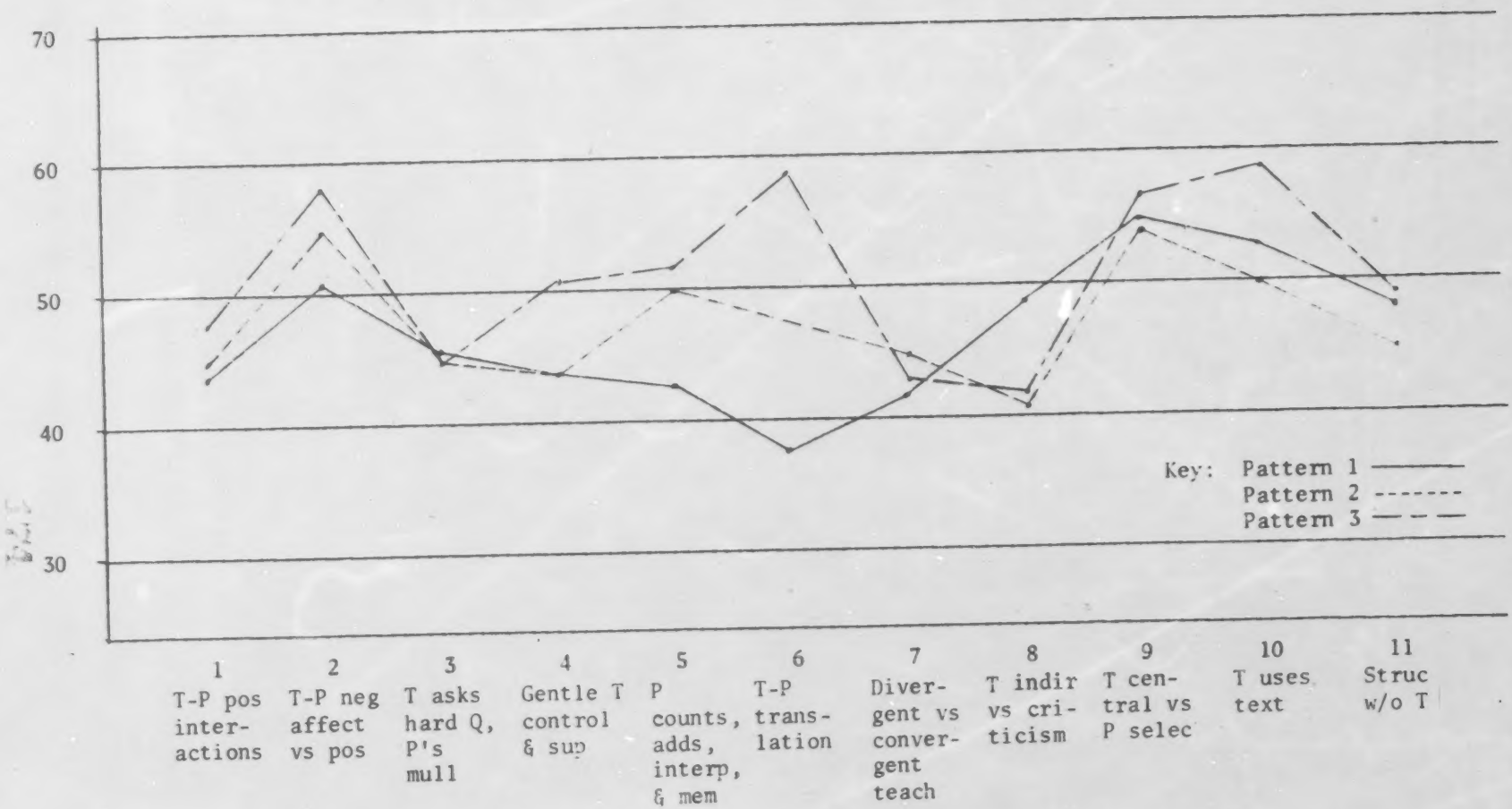


Figure 9: Profile Analysis of Five Instruments
Shape Family 2

Shape Family 3 - The salient aspects of this shape family appear to be the peak for low cognitive level interaction (translation), and the low point for teacher indirect behavior (Figure 10). The major deviation in the family appears to be Pattern 2, in which gentle teacher control, the teachers' asking hard questions and giving pupils time to think, and the use of both low and middle level cognitive interactions are quite high.

Shape Family 4 - The major trends for the family appear to be the relatively high levels of low and moderate level cognitive interaction, the relatively high use of canned activities, and slightly higher than average use of indirect behavior by the teacher and of teacher central activities (Figure 11). The pattern also appears to be one of extremely convergent teaching, with positive interaction below average. The major difference between the two patterns is in the use of hard questions and "think time" by the pupils, with one pattern very low, and the other at a high level, reflecting the willingness of the teacher to wait for an answer from pupils, in contrast to expecting an immediate answer.

Shape Family 5 - The single pattern in this family has three peaks worthy of mention, gentle teacher control, divergent activities, and structure without the teacher (Figure 12), and a low point for teacher central activities. This appears to represent a setting in which pupils are structured into seatwork and small group activities by the teacher, she goes from child to child asking divergent questions, but does not become central in the work of any of these groups.

Shape Family 6 - The major trend of this shape family appears to be a relatively high level of teacher-pupil negative affect and strong control by the teacher, and a low level of gentle teacher control and support, and teacher indirect behavior (Figure 13). Lower level cognitive activities are less frequent than in classrooms in general. The patterns differ in that Pattern 1 is below average for positive interaction, and even higher than Pattern 2 in the negative interactions. Pattern 2, on the other hand, was almost as high for teacher-pupil positive interaction as for negative, and showed considerably more pupil choice.

Shape Family 7 - This was the example, cited at the beginning of this discussion of profiles, in which the patterns appear to be very similar, except for level (Figure 14). The general trend shows high points for divergent teaching and use of "canned" activities, and a low point for indirect teacher behavior, within the pattern itself. The two patterns are largely parallel except for structured activities without the teacher.

Shape Family 8 - The outstanding characteristic of these two patterns is the strong emphsis on subject matter activities at both cognitive levels represented in the analysis, followed by the teacher's being central in the activities of the classroom (Figure 15). Although not especially low for teachers in general, a low point within this shape family is the low level of structured activity without the teacher. The differences between the patterns are minor, with one having a higher level of positive interaction and the teacher's asking hard questions and giving pupils time

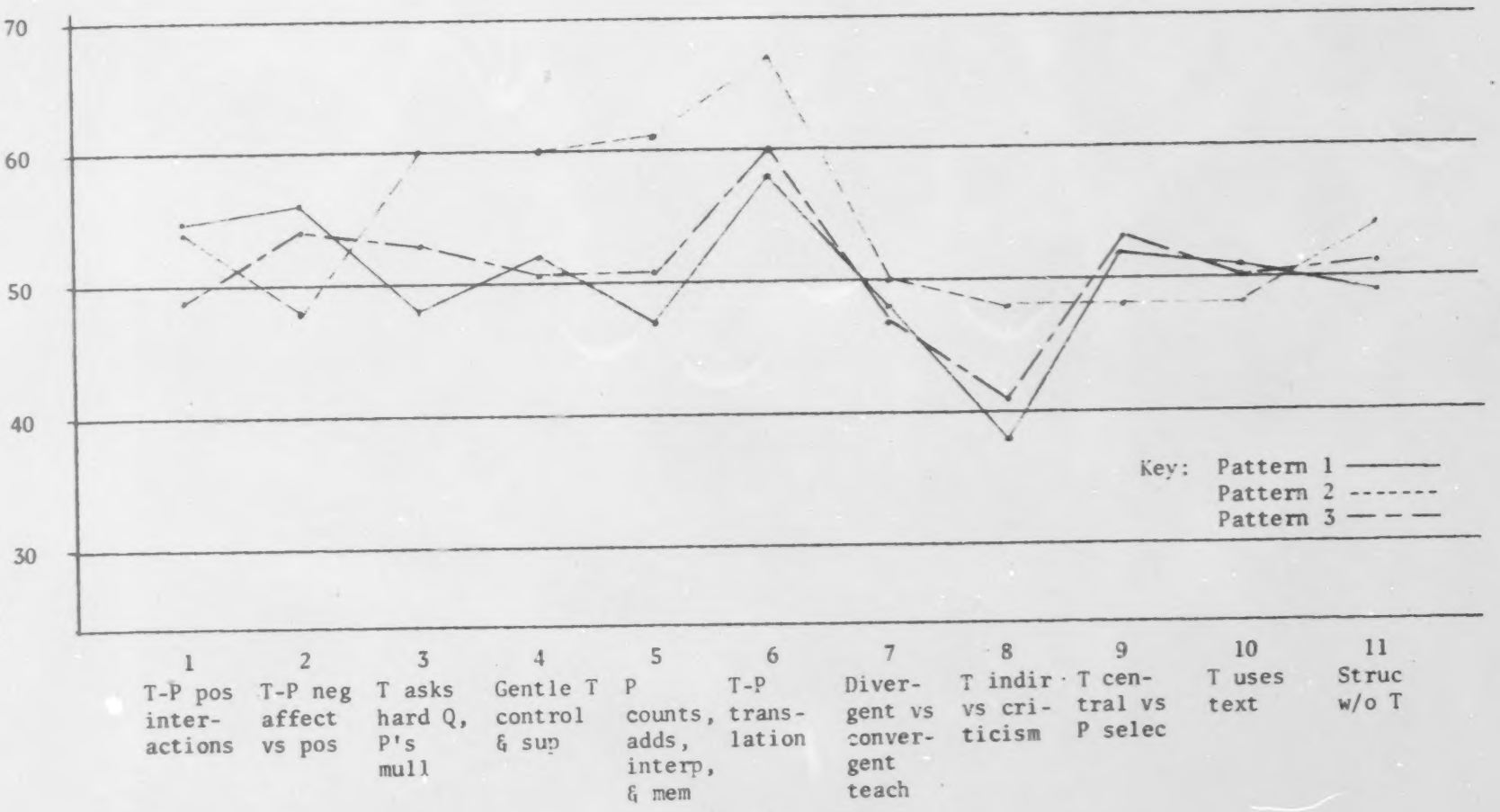


Figure 10: Profile Analysis of Five Instruments
Shape Family 3

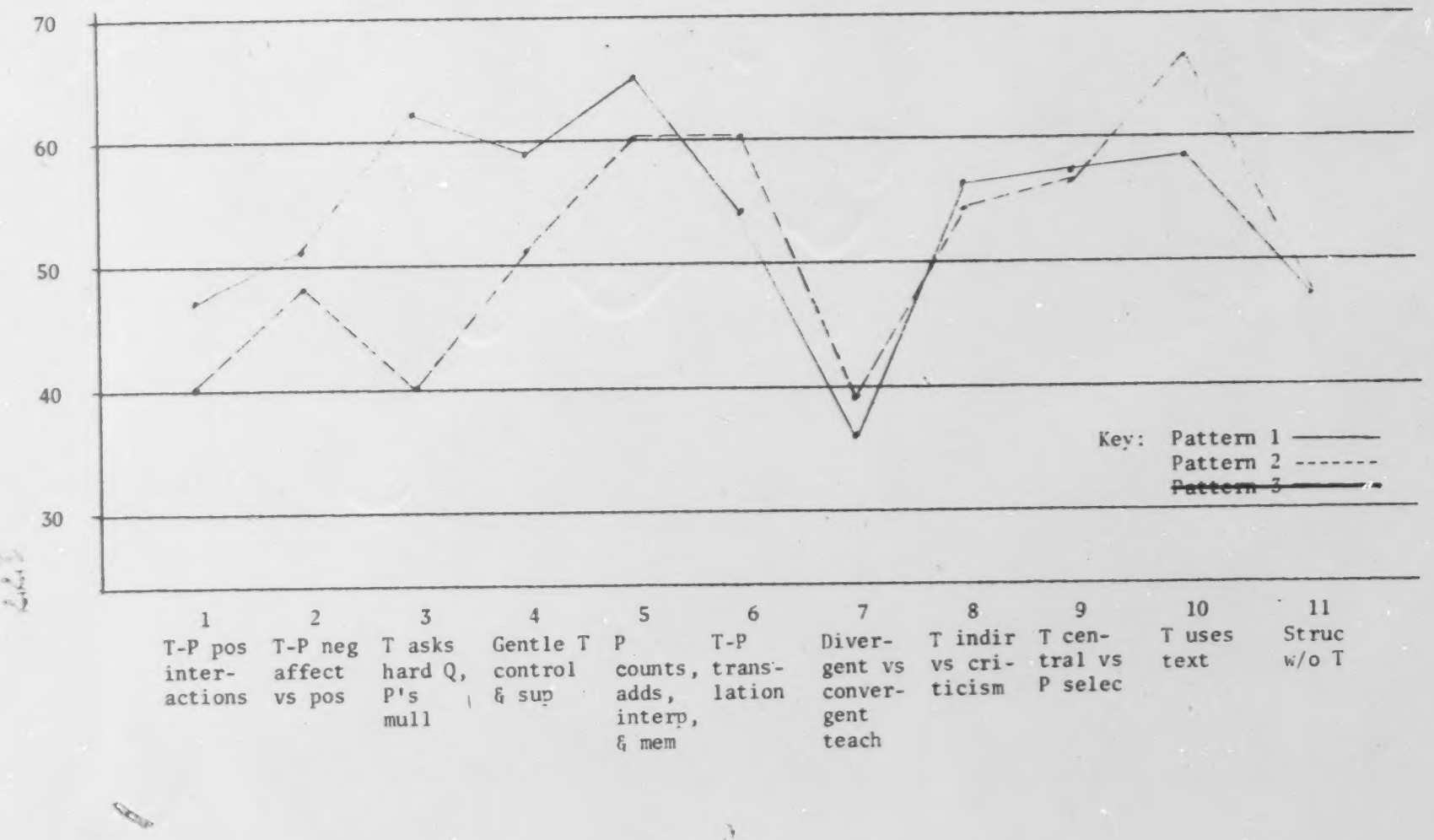


Figure 11: Profile Analysis of Five Instruments
Shape Family 4

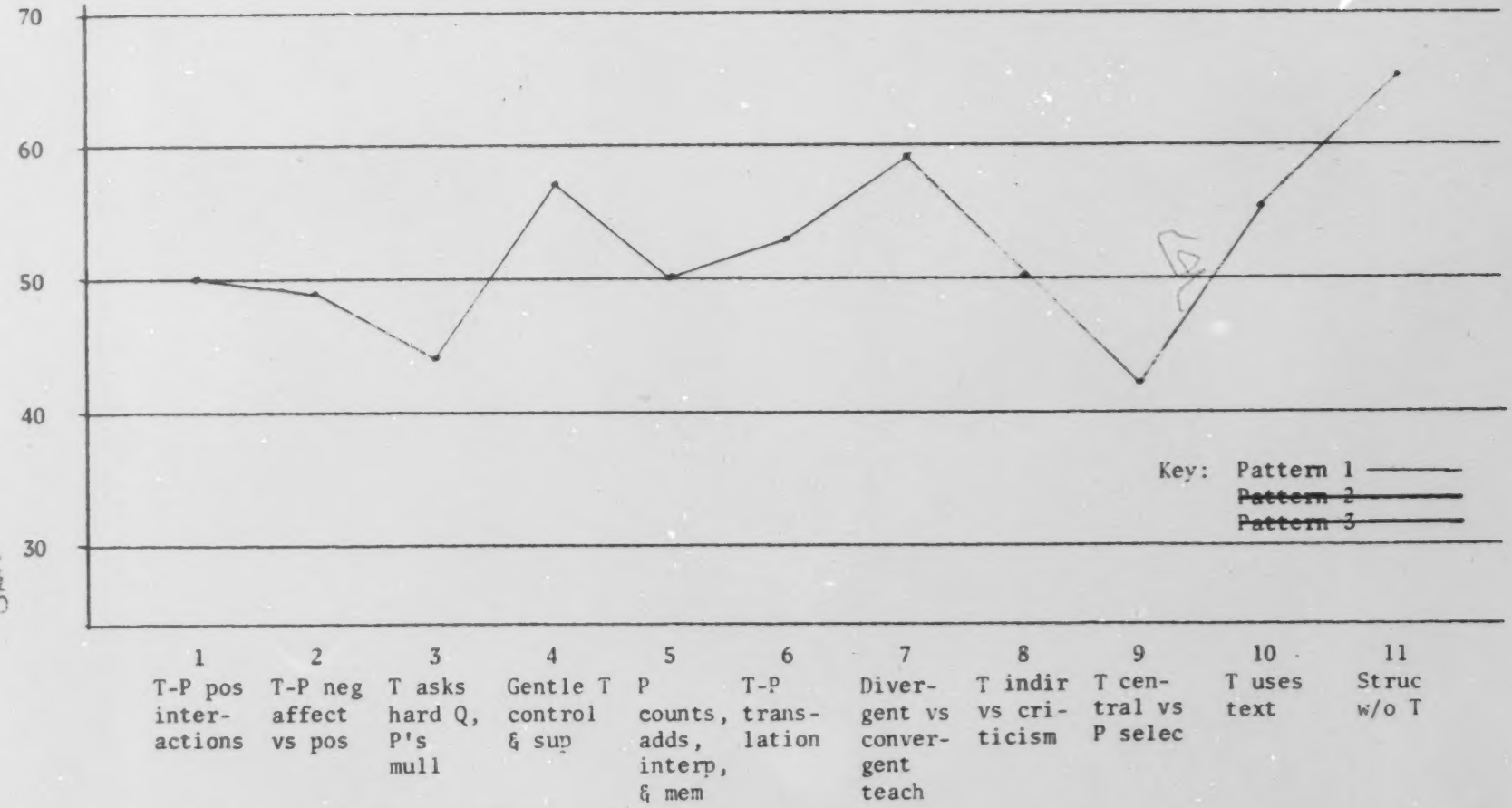


Figure 12: Profile Analysis of Five Instruments
Shape Family 5

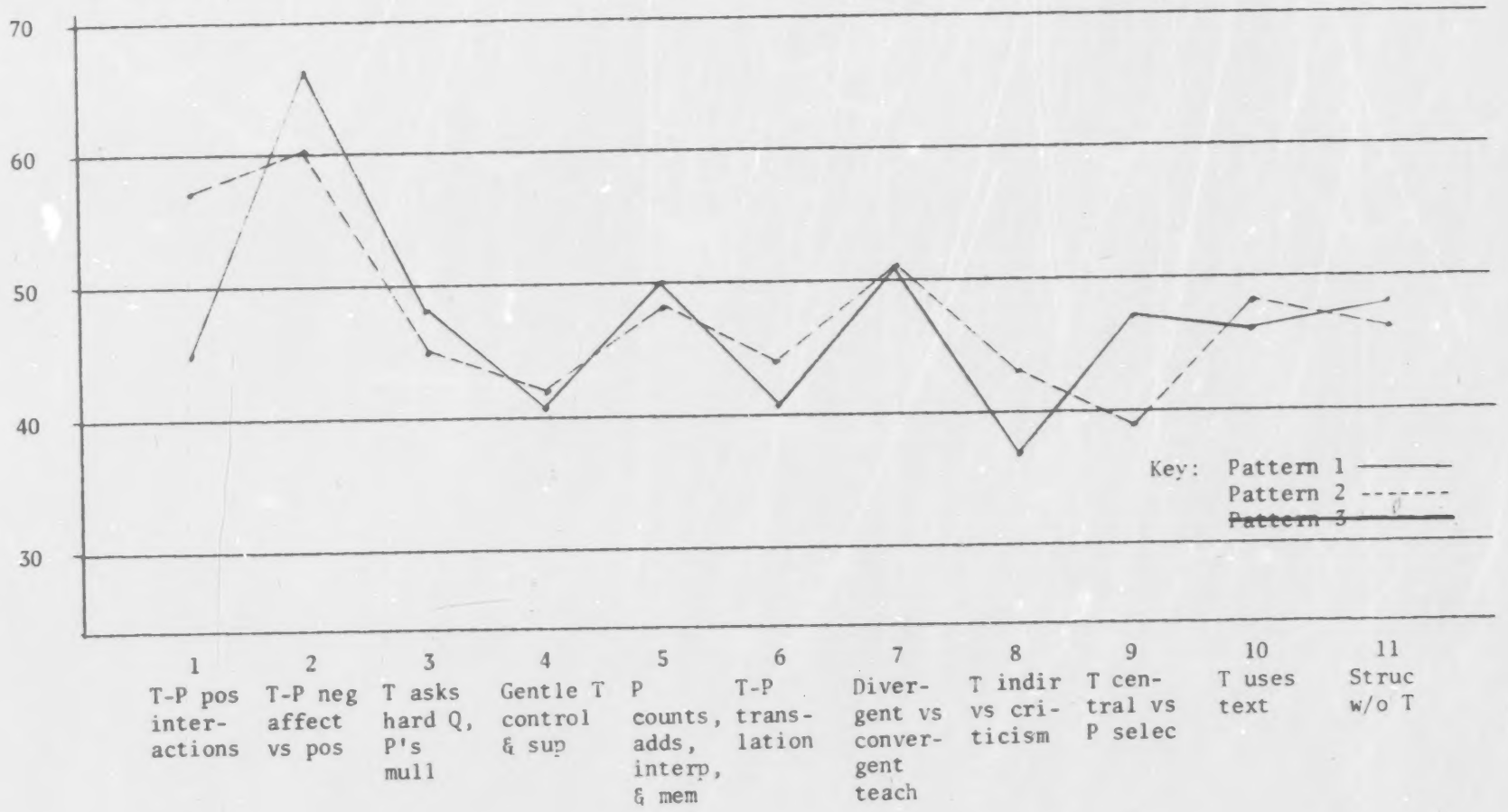


Figure 13: Profile Analysis of Five Instruments
Shape Family 6

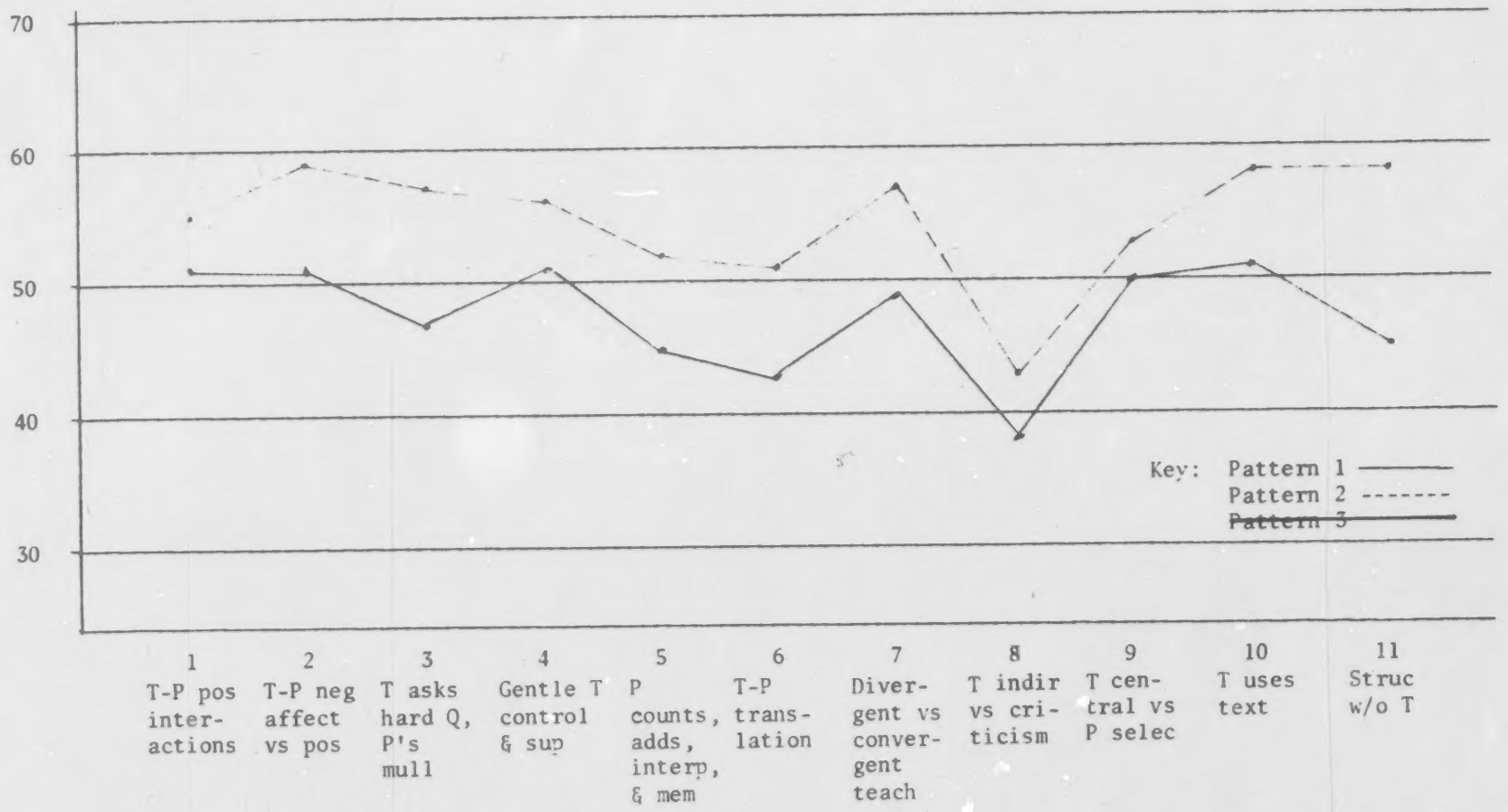


Figure 14: Profile Analysis of Five Instruments
Shape Family 7

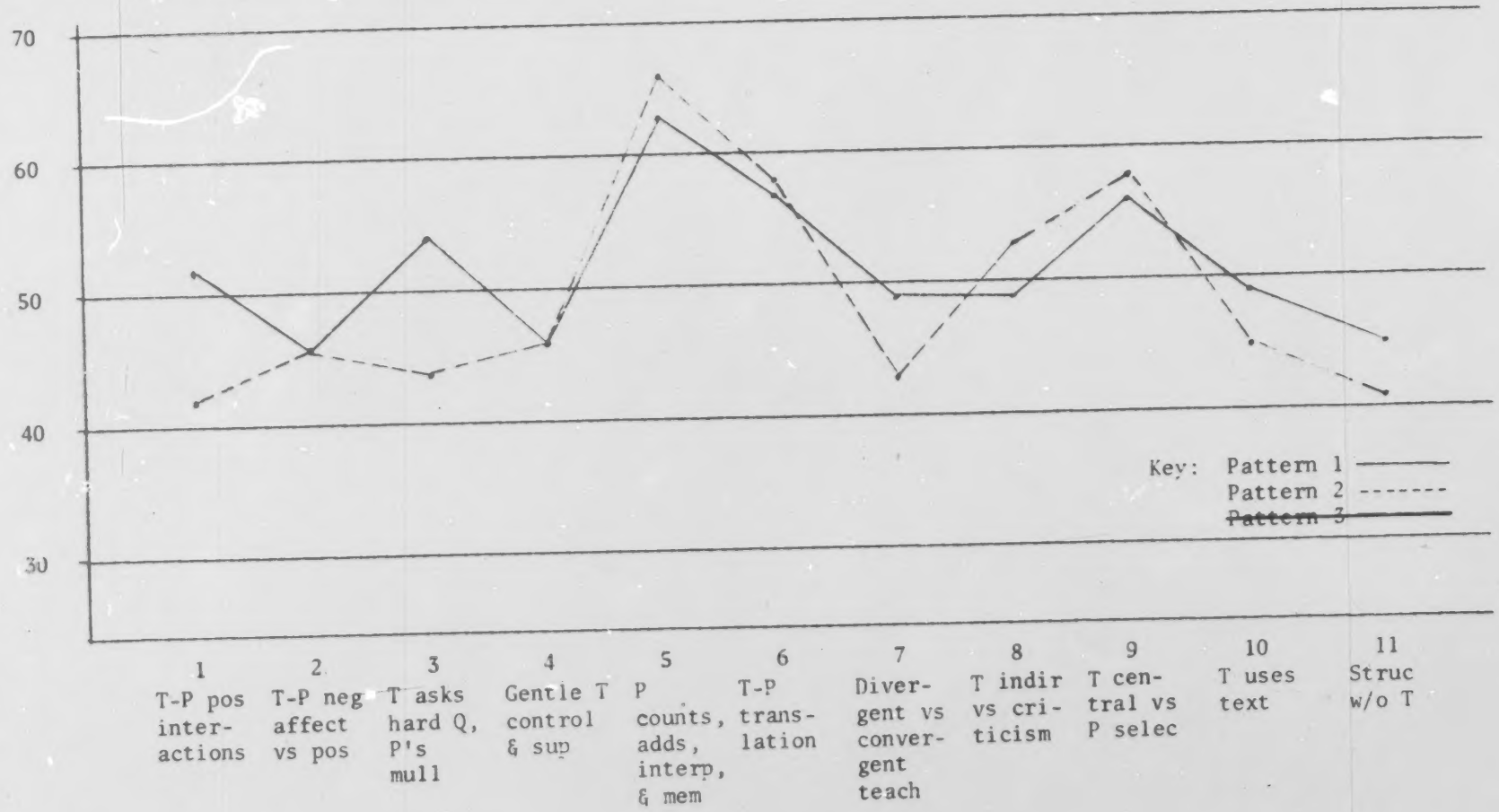


Figure 15: Profile Analysis of Five Instruments
Shape Family 8

to think more often than is true of the other pattern. The family appears to describe subject matter oriented teaching in which the teacher is central.

Shape Family 9 - For the shape family as a whole, the high points appear to be for gentle control and support, divergent activities, and structure without the teacher (Figure 16). There appears to be a low point for teacher-pupil negative affect and strong control by the teacher although not all of the patterns are below average for teachers in general. There are differences in the patterns, with Pattern 2 being higher in asking hard questions and in gentle control than the other patterns, and with Pattern 1 being lower in the cognitive interactions than the other patterns. Pattern 3 is perhaps lower than the other two in the use of pre-packaged materials. But the major measures appear to be gentle control, divergent activities, and structure.

Shape Family 10 - The prominent aspect of this shape family appears to be the low level of translation, with adding and counting and divergent activities next low in the family (Figure 17). The higher level measures are indirect teacher behavior and activities in which the teacher is central. The differences between patterns are primarily those of level for Pattern 1 versus the other two, with Pattern 1 being lower for the two factors reflecting cognitive activities, showing more convergent activities, and more criticism (or less indirect teacher behavior).

Shape Family 11 - The one pattern in this shape family was characterized by a moderately high level of divergent activities, of structure without the teacher, and of positive teacher-pupil interaction (Figure 18). The low points in the profile, although not low for teachers in general, are gentle control and translation level cognitive activities.

Shape Family 12 - The trend for the family as a whole appears to be one of low points for teacher-pupil positive interaction and gentle teacher control (Figure 19). There are relatively clear differences in level between the two patterns across some of the measures. Pattern 2 is lower than Pattern 1 (and quite low compared to teachers in general) for asking hard questions and giving pupils time to think, and for gentle control. Pattern 1 is relatively high for translation activities, and for teacher indirect behavior and teacher central activities.

Perhaps the most compelling aspect of these results is the complexity of teacher behavior which is reflected. This is summarized in Table 119, in which the peaks and low points for each profile are identified. It illustrates in summary fashion the diversity of patterns which is shown.

The distribution of programs across the patterns is shown in Table 120. Programs are no longer lumped together in large groups as was true of the D analysis; rather, they are scattered much more widely across shape families and patterns. But these results do not appear to suggest a very high degree of consistency of classroom behavior within program, in

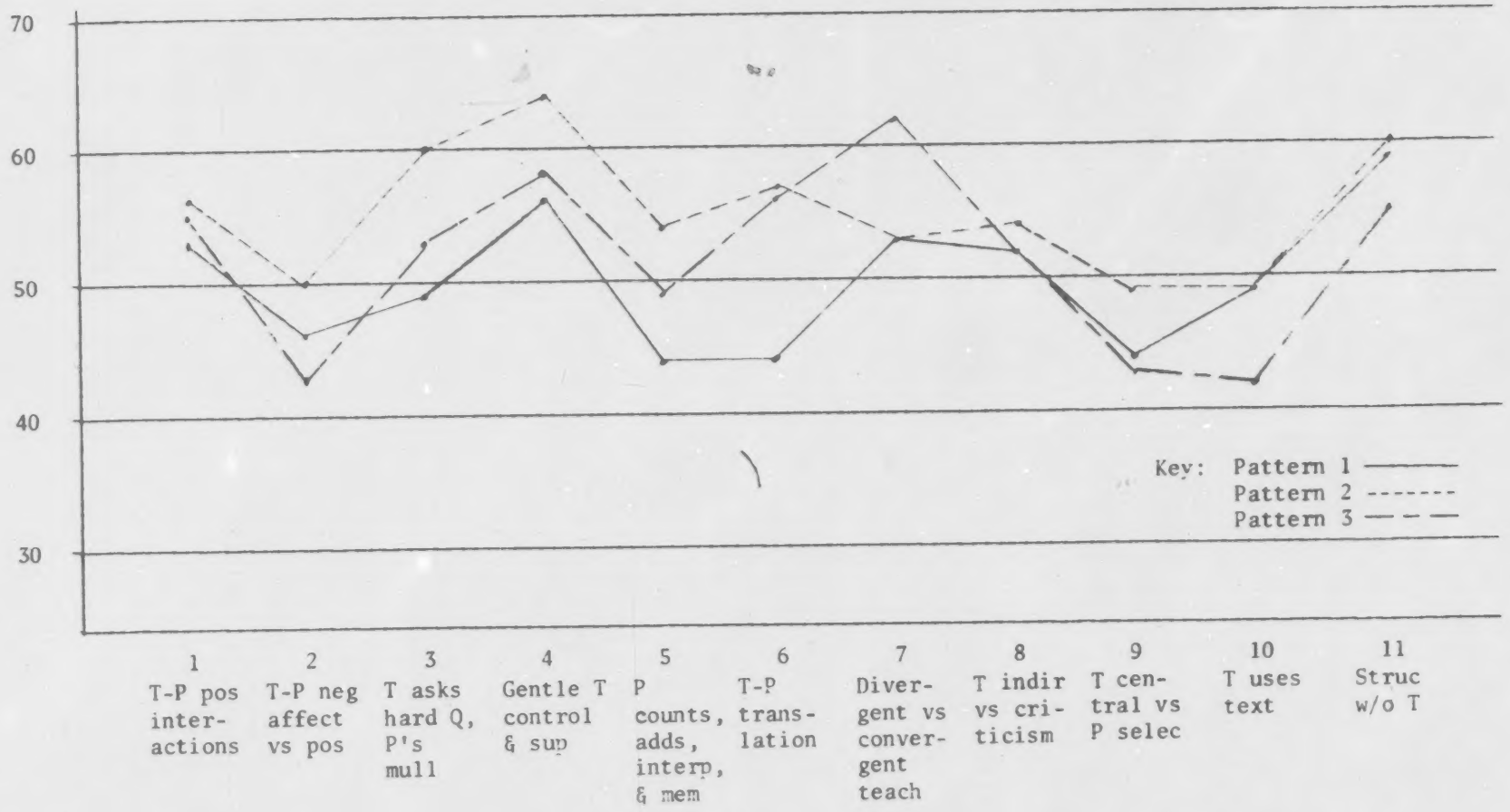


Figure 16 : Profile Analysis of Five Instruments
Shape Family 9

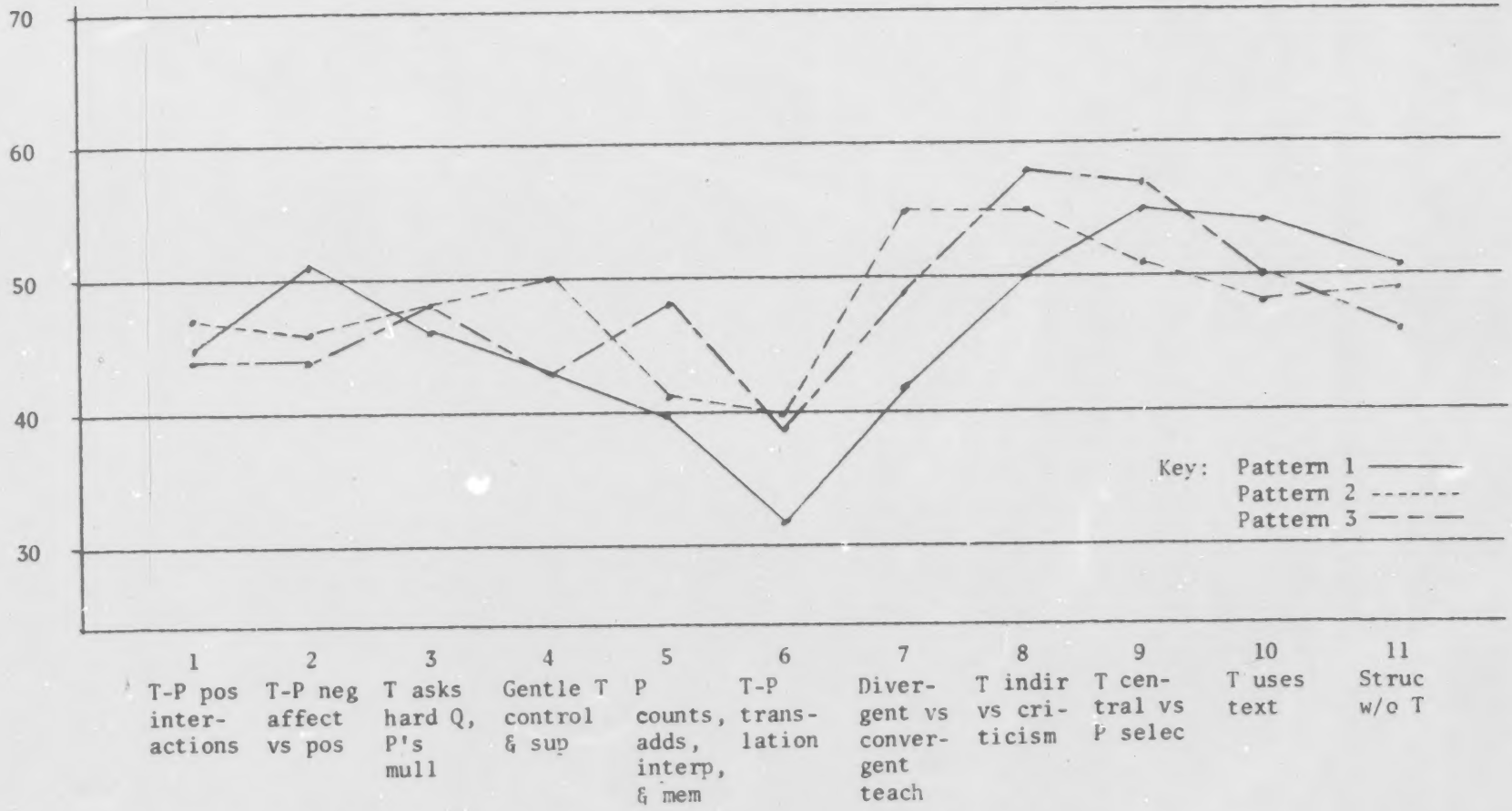


Figure 17: Profile Analysis of Five Instruments
Shape Family 10

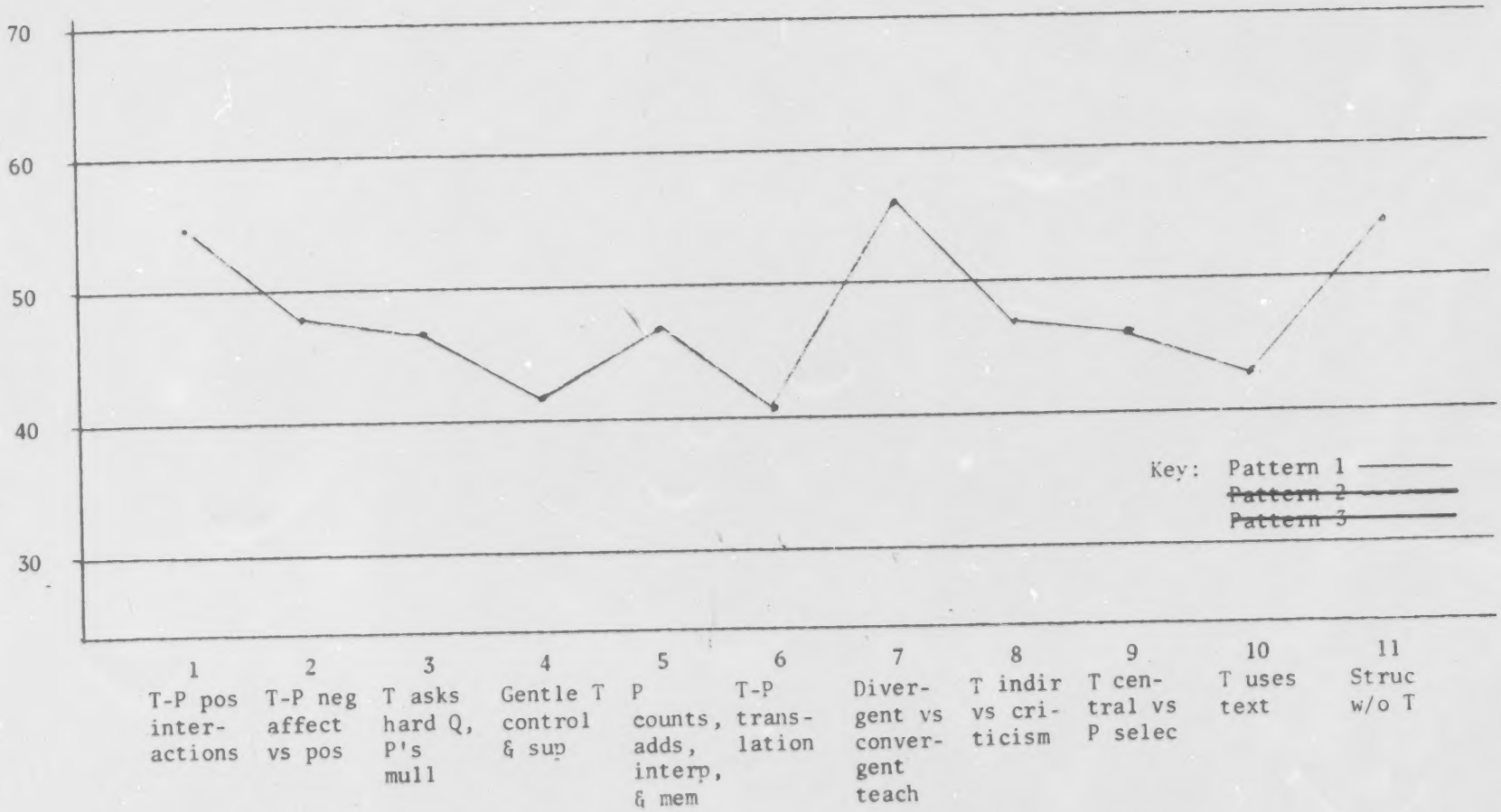


Figure 18: Profile Analysis of Five Instruments
Shape Family 11

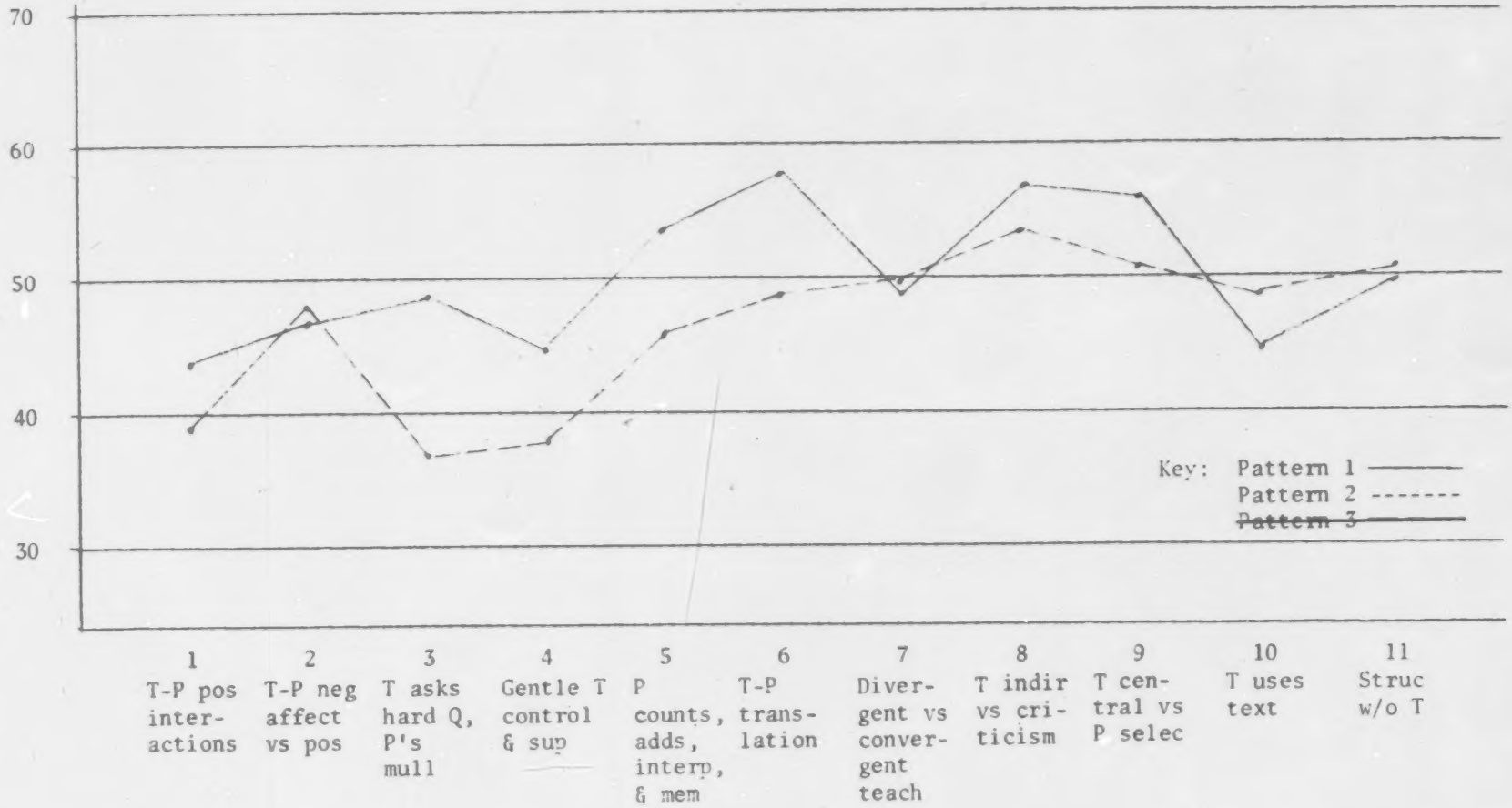


Figure 19: Profile Analysis of Five Instruments
Shape Family 12

Table 119

Summary of Profile Analyses of Factor Scores

Shape Family	Pattern	Factor 1	2	3	4	5	6	7	8	9	10	11
1	1				+a	-						+
	2	-				-	--	-				
	3		++		++	-						++
2	1	-			-	-	--	-				
	2				-				-			
	3		+				+	-	-	+	+	
3	1		+				+		--			
	2			+	+	++	++					
	3						+		-			
4	1			++	+	++		--	+	+	+	
	2	-		-		+	+	--		+	++	
5				-	+			+		-		++
6	1		++		-		-		--			
	2	+	+		-		-		-	--		
7	1						-		--			
	2		+	+	+			+	-		+	+
8	1					++	+			+		
	2	-		-		++	+	-		+		-
9	1				+	-	-			-		+
	2	+		+	++		+					+
	3		-		+		+	++		-	-	
10	1				-	-	--	-				
	2					-	-					
	3	-	-		-		--		+	+		
11					-		-	+			-	
12	1	-					+		+	+		
	2	--		--	--							

a: + = 56 or above - = 44 or below
++ = 61 or above -- = 39 or below

Table 120

Profile Analysis by Program

Shape Family	Pattern	Program 1	2	3	4	5	6	7	8	9
1	1	2*		1	1	1		1		
	2					1				2
	3	1			1	1		1		1
2	1		1				4			5
	2	1	1	1	2		4		1	1
	3	1	1				2			
3	1			2			1			1
	2	1			1		1			1
	3	1		1			2			1
4	1		3		1				3	
	2		3							
5	1					1				1
6	1	1		2	1					
	2	1		1		1				
7	1	1					1		2	
	2					2				
8	1	1	1				1			
	2		2							
9	1	2		1		1		1	1	
	2					1		1		1
	3					2		2		
10	1								1	2
	2	2						1	1	1
	3							1		3
11	1					1		1		
12	1	1			2					
	2				1					1
Program N		10	10	6	8	11	9	9	10	18

* A classroom may enter more than one pattern

that scanning down the column represented by each program does not indicate strong clustering. Subjectively, the greatest degree of clustering appears to be that of Program 6 within Shape Family 2; but even here there are relatively large differences in behavior--especially differences in emphasis on the factors reflecting cognitive level of interaction.

But, it should be remembered that the measures were not chosen to represent the objectives of the sponsors, but rather to identify differences between teachers. Perhaps it is not surprising that homogeneity of classroom behavior within program is not high when the complexity of the behavior is examined by a relatively fine-grained analysis.

Although this is obviously a limited, experimental application of a relatively new analysis, the procedure appears to be a very promising one for dealing with the complexity of the classroom. Although the patterns produced are very diverse, each one seems to create a coherent picture of a classroom. Some are easy to visualize, and bring to mind familiar pictures of classrooms. Others neatly represent classrooms which have stood out as unique. Still others identify nuances of differences which are easily understood but had not been recognized before. Finally, there are a few that are not initially meaningful but which, after time to "think and mull," emerge as a reasonable picture of a classroom. An analysis which has the ability to develop images of these sorts seems a useful one to pursue.

Further Ideas for Identifying Structure

After analysis of the observation data had identified classrooms which appeared to proceed in an orderly fashion without need for more than minor teacher control intervention, additional observations were made in a sample of those classrooms, seeking greater understanding of the structuring process and ideas for items to represent it.

At least two major concepts seem to be basic--the organization of the work groups present in the classroom and the patterns of interaction that occur there; and the scheduling or sequencing of activities that occur, and the expectancies and limits which the pupils' behavior demonstrates.

Work Groups

Additional items for the Work Groups section of FLACCS seem desirable to differentiate the various possibilities observed in Follow Through. Group with Teacher should be subdivided into small group and total group with Teacher (or Adult). Small group with teacher should distinquish whether the teacher is in interaction with all pupils at the same time (that is, all pupils are expected to listen and pay attention), or whether the teacher is physically placed with a subgroup, but only in interaction with one pupil at a time (that is, others may "tune her out" and continue with individual work). An additional aspect of the work group is whether pupils interact only with the teacher, or with each other. Seatwork, which is now identified in another block, should be made a part of the work group section, with the distinction of whether the teacher is available or not.

Awareness of Sequences and Limits

This aspect of structure is identified by pupil behaviors which demonstrate an awareness of sequences of activities and limits of behaviors. Most of the behavior is initiated by a cue of some sort, but the cue only conveys "when", not "what". The cue serves as a symbol for more lengthy instruction earlier which has established a pattern of behavior. Some illustrations follow:

Cue	Pupil Behavior
Teacher: "Row 4"	Certain pupils line up.
Teacher has assignment on board.	Pupils come in and get started.
Pupils leave a reading group.	Another group of pupils gathers around T.
Teacher introducing new activity.	Pupil questions are appropriate.
Recitation.	Pupil questions not appropriate.
Pupil finished seatwork.	Wait for teacher to begin new activity. Begin another assignment. Get a book or puzzle (reward).
Teacher leaves the room.	No change in behavior.
In line, in the building.	No talking.
In line, outside the building	Free to talk.
Seatwork.	Free to sharpen pencil, get material, etc. without permission.
Recitation.	Not free to sharpen pencil, etc.

In addition to the cues and behaviors cited above, there seem to be differences in the freedom of movement which the existing structure permits pupils, differing from activity to activity, and on the average from classroom to classroom. These self-initiated task related movements (without permission from the teacher) seem to reflect structure. During what activities is a pupil free to do such things as sharpen his pencil, get materials, put something in the wastebasket? During activity periods only? Seatwork? While the teacher is orienting pupils to a new task, or commenting on their work? During an instructional period?

Other behaviors don't fit easily into the organization outlined above, and yet seem related to the structure of the classroom. For example, do pupils initiate room maintenance activities such as cleaning up and putting things away, emptying the pencil sharpener, or shutting the door because the hall is noisy?

Careful development would be needed to convert these ideas into items, and probably some of them would not survive development, but they represent possible directions to go in identifying self-directed or self-managed behavior by pupils which free the teacher for more "teaching".

Results: Relation of Classroom Measures to Pupil Data

In beginning to discuss the data relating classroom measures to the measures of pupil gain, several comments seem appropriate. The correlations for the nonentering first grade data are generally higher than those for kindergarten (the two larger groups), and the correlations for Individual Skill tend to be among the highest of those at nonentering first grade. The number of cases for entering first and second grades were much smaller. All of the results which follow should be interpreted in the light of the difficulties found for the pupil gain measures. A ceiling effect was found in numbers of the pupil measures at kindergarten and nonentering first grade which was often accompanied by a nonlinear relation between pretest and raw gain, so that the gain of pupils with high pretest scores was sharply restricted, both with respect to the mean gain which was possible for them, and with respect to the variability which occurred around the mean. Regressed gain was calculated by fitting curves to numbers of the measure and calculating gain as variability around the curve. High scoring pupils were also eliminated from the analysis, but the problem of restricted variability above and below the curve for high prescoring pupils remained for a number of measures. It seems possible that the results which follow may reflect to an unknown degree the inability of higher standing pupils to show an appropriate amount of gain because of measurement difficulties for these two grade levels.

In general, these results for the relations between classroom behavior and pupil gain differ from previous work in numbers of ways (Soar, 1971). The current results suggest that classroom measures such as highly structured teaching, with a relatively narrow subject matter focus and little freedom for pupils were associated with pupil gain. As one approach toward identifying the source of these differences in results, pupils were broken up into subgroups differing by socio-economic status and ethnic group, but the number of classrooms was found to be too small for analysis for white low and nonwhite high social status groups. When additional pupils were dropped because of the ceiling effect, the white high subgroup also had too few classrooms for analysis.

Another approach to the problem was attempted--that of dividing the data by city size. Analyses of classroom behavior with mean pupil gain were carried out in these two classifications, with the finding that the correlations frequently differed from large to small cities. However, the distribution of sponsors differed materially with city size, and in different ways from kindergarten to first grade. If the relations between classroom behavior and pupil growth had been parallel across city size groups from kindergarten to first grade, then there would have been justification for interpreting the differences in terms of city size.

Unfortunately, the smaller number of significant correlations for kindergarten and the differences between kindergarten and first grade for the total group made it difficult to know whether the results were parallel

or not. There was also the difficulty that the number of classrooms in small cities was small (N = 14 to 16), enough that those data are highly variable. The results by city size are included in Appendix D for the reader who may be interested.

Florida Climate and Control System

None of the factors related in consistent manner across the four grade levels (Tables 121 through 128). Two, Pupil Negative Affect, and Work Without the Teacher, related significantly negatively in the two higher grade levels, but not in the lower. Teacher Attention in a Task Setting related positively to skill gain in both lower grade levels, but did not relate in the higher ones. Pupil Free Choice related negatively in kindergarten, and nonentering first and negatively but not significantly in second grade , but not in entering first; however, the mean level in the entering first grade was quite low. The expectation that Strong Control would have a negative effect on pupil gain was not supported (the one negative correlation is essentially chance among the eighteen calculated). Teacher-Pupil Supportive Behavior and Nonverbal Gentle Control only related significantly in nonentering first grade, but related negatively there, contrary to expectation. The other factors either failed to relate, or related in contradictory fashion.

Number of Days Absent was related to classroom process only in the upper two grade levels, relating positively to Strong Control and negatively to Teacher Positive Affect, both of which seem reasonable. The correlation with Work Without the Teacher was negative, however, which does not seem reasonable.

In general, the relations between teacher expression of affect and gain which are generally expected failed to appear. Rather, the dimensions reflecting structuring of classroom activities and pupil involvement with the teacher were the ones which tended to relate to pupil gain. Perhaps the major differences among Follow Through classrooms are not on affective dimensions but rather ones that reflect structuring.

Teacher Practices Observation Record

The correlations between the Teacher Practices Observation Record and pupil gain are presented in Tables 129 through 136. Convergent Teaching related positively with gain at three grade levels, but not at entering first, where the level of convergent teaching was quite high. Experimental Teaching related significantly negatively with gain in nonentering first grade, and negatively but not significantly at second. It was significantly positive at entering first grade, but the correlation was with Concrete gain, which does not seem reasonable. Pupil Free Choice vs Teacher Structured Activity related negatively to gain at all levels except entering first, where the mean level was low. This indicates that Pupil Free Choice was negatively related or Teacher Structured Activity was positively related with gain.

Table 121

Florida Climate and Control System
Means and Standard Deviations for Kindergarten[1]

Factors	$\bar{X}$	S
1. Strong Control	50.38	7.15
2. Pupil Free Choice vs No Choice	52.34	4.78
3. Teacher-Pupil Supportive Behavior	50.63	5.71
4. Nonverbal Gentle Control	50.92	6.15
5. Gentle Control	50.61	5.39
6. Work Without Teacher	46.52	5.56
7. Pupil Negative Affect	51.52	6.75
8. Teacher Attention in a Task Setting	49.60	6.33
9. Teacher Positive Affect	51.34	6.35

[1]N = 54 classrooms

Table 122

Florida Climate and Control System
Correlations with Pupil Data for Kindergarten

Factors	Conc.[2]	Skill[1]	Abst.[1]	Days Abs.[1]
1. Strong Control	-.11	-.14	-.14	.22
2. Pupil Free Choice vs No Choice	.03	-.27*	-.30*	-.07
3. Teacher-Pupil Supportive Behavior	-.09	-.10	-.17	.25
4. Nonverbal Gentle Control	-.21	.03	-.06	.04
5. Gentle Control	-.13	.04	-.02	-.02
6. Work Without Teacher	-.25	-.12	-.22	-.18
7. Pupil Negative Affect	-.17	-.20	-.24	.16
8. Teacher Attention in a Task Setting	-.05	.36**	.15	-.23
9. Teacher Positive Affect	.00	.09	-.03	-.23

[1]N = 54 classrooms

[2]N = 49 classrooms

*$p < .05$

**$p < .01$

Table 123

Florida Climate and Control System
Means and Standard Deviations for Entering First Grade[1]

Factors	$\bar{X}$	S
1. Strong Control	47.76	5.17
2. Pupil Free Choice vs No Choice	46.68	4.42
3. Teacher-Pupil Supportive Behavior	48.51	6.28
4. Nonverbal Gentle Control	47.09	7.44
5. Gentle Control	52.67	7.44
6. Work Without Teacher	48.20	6.27
7. Pupil Negative Affect	50.81	7.75
8. Teacher Attention in a Task Setting	46.75	6.94
9. Teacher Positive Affect	50.31	6.02

[1]N = 20 classrooms

Table 124

Florida Climate and Control System
Correlations with Pupil Data for Entering First Grade[1]

Factors	Conc.	Skill	Abstract		Days
			Ind.	Group	Abs.
1. Strong Control	.10	.01	-.24	-.16	.34
2. Pupil Free Choice vs No Choice	.38	.16	-.09	.12	.13
3. Teacher-Pupil Supportive Behavior	.32	.18	-.25	.03	.05
4. Nonverbal Gentle Control	.07	.00	-.18	.06	-.36
5. Gentle Control	.08	.29	-.01	-.28	.30
6. Work Without Teacher	.31	-.06	.33	.33	.22
7. Pupil Negative Affect	-.12	.09	-.33	-.25	.26
8. Teacher Attention in a Task Setting	.13	.47*	-.39	.05	-.08
9. Teacher Positive Affect	.42	.04	.51*	-.19	.18

[1]N = 20 classrooms

*$p < .05$

Table 125

Florida Climate and Control System
Means and Standard Deviations for Nonentering First Grades[1]

Factors	$\bar{X}$	S
1. Strong Control	50.49	5.26
2. Pupil Free Choice vs No Choice	48.84	6.16
3. Teacher-Pupil Supportive Behavior	48.84	6.03
4. Nonverbal Gentle Control	49.80	7.22
5. Gentle Control	48.30	6.14
6. Work Without Teacher	51.48	6.93
7. Pupil Negative Affect	48.87	5.42
8. Teacher Attention in a Task Setting	50.26	5.55
9. Teacher Positive Affect	49.22	6.84

[1]N = 50 classrooms

Table 126

Florida Climate and Control System
Correlations with Pupil Data for Nonentering First Grades

Factors	Group			Individual			Days
	Conc.[1]	Skill[1]	Abst.[1]	Conc.[2]	Skill[1]	Abst.[1]	Abs.[1]
1. Strong Control	.05	.13	-.12	-.16	.01	-.12	.27*
2. Pupil Free Choice vs No Choice	-.04	-.31*	-.14	.10	-.51**	-.16	-.07
3. Teacher-Pupil Supportive Behavior	-.23	-.27*	-.26	-.16	-.25	-.31*	.10
4. Nonverbal Gentle Control	-.28*	.04	-.20	-.31*	.21	-.15	-.03
5. Gentle Control	-.02	.07	.09	-.13	.15	.11	-.05
6. Work Without Teacher	-.43**	-.20	.02	-.39**	.12	-.46**	-.10
7. Pupil Negative Affect	-.10	-.28*	-.23	-.07	-.46**	-.23	.24
8. Teacher Attention in a Task Setting	.15	.13	-.17	-.10	-.05	-.03	-.03
9. Teacher Positive Affect	-.30*	-.15	-.13	-.28	-.04	-.32*	-.27*

[1]N = 50 classrooms. [2]N = 47 classrooms. *p <.05. **p <.01.

Table 127

Florida Climate and Control System
Means and Standard Deviations for Second Grade[1]

Factors	$\bar{X}$	S
1. Strong Control	48.30	5.53
2. Pupil Free Choice vs No Choice	48.39	6.91
3. Teacher-Pupil Supportive Behavior	47.50	7.58
4. Nonverbal Gentle Control	47.70	6.18
5. Gentle Control	46.18	7.36
6. Work Without Teacher	51.45	8.10
7. Pupil Negative Affect	48.88	5.13
8. Teacher Attention in a Task Setting	46.75	6.34
9. Teacher Positive Affect	48.86	7.69

[1]N = 20 classrooms

Table 128

Florida Climate and Control System
Correlations with Pupil Data for Second Grade

Factors	Conc.	Skill		Abstract		Days Abs.
		Ind.	Group	Ind.	Group	
1. Strong Control	-.49*	-.17	-.31	-.25	-.33	.14
2. Pupil Free Choice vs No Choice	.05	-.40	-.34	-.16	.09	-.21
3. Teacher-Pupil Supportive Behavior	-.29	-.30	-.22	-.29	.05	-.12
4. Nonverbal Gentle Control	-.34	.08	-.03	.03	.23	-.17
5. Gentle Control	-.07	.26	.33	.34	-.14	.08
6. Work Without Teacher	.28	-.35	-.41	-.51*	-.22	-.47*
7. Pupil Negative Affect	-.22	-.45*	-.57**	-.26	-.02	-.17
8. Teacher Attention in a Task Setting	.25	-.23	.03	.30	.05	.06
9. Teacher Positive Affect	.09	-.04	.03	.05	-.06	-.02

[1]N = 20 classrooms

*p < .05

**p < .01

Table 129

Teacher Practices Observation Record
Means and Standard Deviations for Kindergarten[1]

Factors	$\bar{X}$	S
1. Convergent Teaching	48.38	6.30
2. Experimental Teaching	49.17	4.45
3. Teacher Discourages Exploration	48.52	4.21
4. Undifferentiated Teaching	49.57	6.49
5. Pupil Free Choice vs Teacher Structured Activity	52.27	6.02
6. Unnamed	50.44	4.87
7. Exploration of Ideas vs Textbook Learning	51.16	5.38

[1]N = 54 classrooms

Table 130

Teacher Practices Observation Record
Correlations with Pupil Data for Kindergarten

Factors	Conc.[2]	Skill[1]	Abst.[1]	Days Abs.[1]
1. Convergent Teaching	-.15	.26*	.16	.08
2. Experimental Teaching	.00	-.01	-.17	-.06
3. Teacher Discourages Exploration	-.08	.11	-.02	.05
4. Undifferentiated Teaching	-.01	-.08	-.10	.10
5. Pupil Free Choice vs Teacher Structured Activity	.01	-.31*	-.26*	.02
6. Unnamed	-.19	-.07	-.13	.19
7. Exploration of Ideas vs Textbook Learning	.01	-.22	-.22	-.15

[1]N = 54 classrooms

[2]N = 49 classrooms

*$p < .05$

**$p < .01$

Table 131

Teacher Practices Observation Record
Means and Standard Deviations for Entering First Grade[1]

Factors	$\bar{X}$	S
1. Convergent Teaching	54.20	5.76
2. Experimental Teaching	50.44	5.66
3. Teacher Discourages Exploration	50.17	3.59
4. Undifferentiated Teaching	48.08	7.03
5. Pupil Free Choice vs Teacher Structured Activity	46.66	5.39
6. Unnamed	52.78	7.41
7. Exploration of Ideas vs Textbook Teaching	48.83	5.92

[1]N = 20 classrooms

Table 132

Teacher Practices Observation Record
Correlations with Pupil Data for Entering First Grade[1]

Factors	Conc.	Skill	Abstract		Days
			Ind.	Group	Abs.
1. Convergent Teaching	-.31	-.11	-.05	.13	-.29
2. Experimental Teaching	.52*	.14	-.02	.13	.18
3. Teacher Discourages Exploration	.04	-.53*	.29	.14	.08
4. Undifferentiated Teaching	-.19	.16	-.33	-.30	.25
5. Pupil Free Choice vs Teacher Structured Activity	.27	.27	-.24	.09	.02
6. Unnamed	-.07	.22	-.19	-.22	.18
7. Exploration of Ideas vs Textbook Teaching	.36	.30	-.12	-.06	.31

[1]N = 20 classrooms

*$p < .05$

Table 133

Teacher Practices Observation Record
Means and Standard Deviations for Nonentering First Grades[1]

Factors	$\bar{X}$	S
1. Convergent Teaching	50.57	7.86
2. Experimental Teaching	49.30	5.43
3. Teacher Discourages Exploration	50.43	5.79
4. Undifferentiated Teaching	49.30	7.81
5. Pupil Free Choice vs Teacher Structured Activity	49.04	6.00
6. Unnamed	49.94	4.74
7. Exploration of Ideas vs Textbook Teaching	48.81	6.59

[1]N = 50 classrooms

Table 134

Teacher Practices Observation Record
Correlations with Pupil Data for Nonentering First Grades

Factor	Group			Individual			Days Abs.[1]
	Conc.[1]	Skill[1]	Abst.[1]	Conc.[2]	Skill[1]	Abst.[1]	
1. Convergent Teaching	.06	.31*	.28*	-.03	.42**	.44**	.15
2. Experimental Teaching	-.20	-.32*	-.30*	.11	-.44**	-.28*	.11
3. Teacher Discourages Exploration	-.11	.12	-.07	-.46**	.18	-.21	-.08
4. Undifferentiated Teaching	.31*	.10	-.16	.20	-.07	.28*	.07
5. Pupil Free Choice vs Teacher Structured Activity	-.11	-.43**	-.25	.19	-.58**	-.25	.07
6. Unnamed	.16	.03	-.03	.10	-.14	.05	.17
7. Exploration of Ideas vs Textbook Teaching	-.15	-.45**	-.21	.22	-.57**	-.24	-.08

[1]N = 50 classrooms

[2]N = 47 classrooms

*$p < .05$

**$p < .01$

Table 135

Teacher Practices Observation Record
Means and Standard Deviations for Second Grade[1]

Factors	$\bar{X}$	S
1. Convergent Teaching	48.77	7.33
2. Experimental Teaching	50.08	6.78
3. Teacher Discourages Exploration	48.07	5.68
4. Undifferentiated Teaching	48.78	10.79
5. Pupil Free Choice vs Teacher Structured Activity	50.10	7.42
6. Unnamed	46.79	2.69
7. Exploration of Ideas vs Textbook Teaching	51.01	6.72

[1]N = 20 classrooms

Table 136

Teacher Practices Observation Record
Correlations with Pupil Data for Second Grade[1]

Factors	Conc.	Skill		Abstract		Days
		Ind.	Group	Ind.	Group	Abs.
1. Convergent Teaching	-.22	.52*	.52*	.20	.16	-.01
2. Experimental Teaching	-.09	-.30	-.30	-.35	-.03	-.24
3. Teacher Discourages Exploration	-.23	-.10	-.06	-.13	-.00	-.11
4. Undifferentiated Teaching	-.42	.23	.22	-.01	.12	.41
5. Pupil Free Choice vs Teacher Structured Activity	-.05	-.39	-.45*	-.22	.11	-.29
6. Unnamed	-.20	.05	.10	.23	-.26	.37
7. Exploration of Ideas vs Textbook Teaching	-.02	-.34	-.46*	-.27	-.00	-.27

[1]N = 20 classrooms *p < .05

Exploration of Ideas vs Textbook Teaching related negatively to pupil gain in the two higher grade levels, but not in the lower two. Exploration of ideas is negatively associated with gain, or Textbook Teaching positively. The other factors either show no relationships, single correlations which may well be chance, or contradictory ones. Days Absent did not relate to any of these process factors.

These results seem to parallel those from the Florida Climate and Control System in indicating a positive relation between narrowly focused management of subject matter or limited pupil freedom, and gain. Again, as with FLACCS, entering first grade sometimes differs but apparently does so because pupils had less freedom there, on the average, than in the other three groups.

Reciprocal Category System

It should be remembered that this instrument, as well as the Cognitive Taxonomy which follows, were coded from audio tape, and it seems reasonable that some loss of information may have occurred in comparison to live observation.

The results for the RCS are shown in Tables 137 through 144. Varied Pupil Initiated Interaction vs Response to Teacher related negatively to Skill growth at the upper two levels. This indicates either that pupil initiation related negatively or response to the teacher related positively. Entering first grade did not show this relationship, but again it stood low on the measure indicating less pupil initiation or more response to the teacher than the other grade levels. Consistent with this, Drill related positively to gain, primarily skill, at both kindergarten and nonentering first grade. Teacher Direction and Criticism vs Teacher Indirect related positively with both Skill measures at nonentering first grade only. Other factors showed no relation, single correlations with gain, or contradictory ones.

The number of Days Absent related positively with Varied Pupil Initiated Interaction vs Response to Teacher and with Pupil Talk, but only at kindergarten, and the two significant correlations from a total of 36 is little better than chance.

The negative association between Varied Pupil Initiated Interaction and gain, and the positive association between Drill and gain seem to parallel again the tentative conclusions suggested by FLACCS and the TPOR that a narrowly focused classroom and less pupil freedom are related to subject matter growth. The fact that this instrument was coded by a different set of observers than the previous two "live" instruments--coders who had not seen these classrooms--lends added support to the agreement.

Table 137

Reciprocal Category System
Means and Standard Deviations for Kindergarten[1]

Factors	$\bar{X}$	S
1. Varied Pupil Initiated Interaction vs Response to Teacher	53.07	5.16
2. Teacher Response and Amplification	51.19	5.94
3. Drill	47.91	6.83
4. Teacher Direction and Criticism vs Teacher Indirect	49.10	6.38
5. Extended Teacher Talk	50.89	6.87
6. Pupil Talk	49.21	8.74
7. Teacher Acceptance vs Teacher Correction	49.76	7.94
8. Supportive Pupil Talk	50.97	4.94
9. Teacher-Pupil Interaction in Accepting Climate	49.44	6.67

[1]N = 54 classrooms

Table 138

Reciprocal Category System
Correlations with Pupil Data for Kindergarten

Factors	Conc.[2]	Skill[1]	Abst.[1]	Days Abs.[1]
1. Varied Pupil Initiated Interaction vs Response to Teacher	.14	-.02	-.14	.30*
2. Teacher Response and Amplification	.08	.09	-.04	.18
3. Drill	.00	.37**	.28*	-.06
4. Teacher Direction and Criticism vs Teacher Indirect	-.07	.05	-.11	-.03
5. Extended Teacher Talk	-.11	-.14	-.10*	-.01
6. Pupil Talk	.24	.07	.26*	.40**
7. Teacher Acceptance vs Teacher Correction	.07	.17	.19	-.20
8. Supportive Pupil Talk	-.11	-.12	-.03	.08
9. Teacher-Pupil Interaction in Accepting Climate	-.03	.07	.02	.06

[1]N = 54 classrooms
[2]N = 49 classrooms

*$p < .05$
**$p < .01$

Table 139

Reciprocal Category System
Means and Standard Deviations for Entering First Grade[1]

Factors	$\bar{X}$	S
1. Varied Pupil Initiated Interaction vs Response to Teacher	47.35	4.65
2. Teacher Response and Amplification	49.46	9.28
3. Drill	53.11	6.18
4. Teacher Direction and Criticism vs Teacher Indirect	49.78	6.11
5. Extended Teacher Talk	50.29	4.24
6. Pupil-Talk	48.42	5.52
7. Teacher Acceptance vs Teacher Correction	51.89	7.14
8. Supportive Pupil Talk	51.37	7.21
9. Teacher-Pupil Interaction in Accepting Climate	52.66	6.05

[1]N = 20 classrooms

Table 140

Reciprocal Category System
Correlations with Pupil Data for Entering First Grade[1]

Factors	Conc.	Skill	Abstract		Days Abs.
			Ind.	Group	
1. Varied Pupil Initiated Interaction vs Response to Teacher	.17	.32	-.14	.07	-.20
2. Teacher Response and Amplification	-.25	.12	-.28	-.15	-.20
3. Drill	.08	-.18	.22	.02	-.05
4. Teacher Direction and Criticism vs Teacher Indirect	-.39	.10	-.20	-.14	-.20
5. Extended Teacher Talk	.13	.26	.18	.04	.22
6. Pupil Talk	.10	.01	-.05	.23	.17
7. Teacher Acceptance vs Teacher Correction	.03	.15	.35	-.12	.00
8. Supportive Pupil Talk	-.18	-.11	-.02	.14	-.16
9. Teacher-Pupil Interaction in Accepting Climate	-.05	-.00	-.06	-.06	-.20

[1]N = 20 classrooms

Table 141

Reciprocal Category System
Means and Standard Deviations for Nonentering First Grades[1]

Factors	$\bar{X}$	S
1. Varied Pupil Initiated Interaction vs Response to Teacher	48.46	5.46
2. Teacher Response and Amplification	48.36	6.27
3. Drill	51.74	7.12
4. Teacher Direction and Criticism vs Teacher Indirect	51.00	6.59
5. Extended Teacher Talk	49.56	6.07
6. Pupil Talk	49.34	7.33
7. Teacher Acceptance vs Teacher Correction	48.76	6.78
8. Supportive Pupil Talk	50.16	5.01
9. Teacher-Pupil Interaction in Accepting Climate	50.15	6.16

[1]N = 50 classrooms

Table 142

Reciprocal Category System
Correlations with Pupil Data for Nonentering First Grades

Factor	Group			Individual			Days
	Conc.[1]	Skill[1]	Abst.[1]	Conc.[2]	Skill[1]	Abst.[1]	Abs.[1]
1. Varied Pupil Initiated Interaction vs Response to Teacher	.03	-.20	-.14	.13	-.42**	-.17	.02
2. Teacher Response and Amplification	.05	.11	.00	-.07	-.14	-.07	-.05
3. Drill	-.06	.32*	.33*	-.24	.53**	.20	.06
4. Teacher Direction and Criticism vs Teacher Indirect	.15	.37**	-.10	.02	.32*	.14	.04
5. Extended Teacher Talk	.09	-.26	-.34*	.07	-.41**	-.07	.16
6. Pupil Talk	.14	.02	.10	.10	.04	-.07	.00
7. Teacher Acceptance vs Teacher Correction	-.24	-.18	.23	-.22	-.03	.03	-.05
8. Supportive Pupil Talk	.06	-.07	.03	.11	-.29*	-.01	.10
9. Teacher-Pupil Interaction in Accepting Climate	-.08	.10	.19	-.01	.01	.25	.03

[1]N = 50 Classrooms. [2]N = 47 classrooms. *$p < .05$; **$p < .01$.

Table 143

Reciprocal Category System
Means and Standard Deviations for Second Grade[1]

Factors	$\overline{X}$	S
1. Varied Pupil Initiated Interaction vs Response to Teacher	49.62	7.03
2. Teacher Response and Amplification	49.49	7.21
3. Drill	47.65	7.20
4. Teacher Direction and Criticism vs Teacher Indirect	49.89	6.92
5. Extended Teacher Talk	50.42	7.38
6. Pupil Talk	49.28	8.37
7. Teacher Acceptance vs Teacher Correction	52.08	7.14
8. Supportive Pupil Talk	48.76	4.57
9. Teacher-Pupil Interaction in Accepting Climate	47.56	7.33

[1]N = 20 classrooms

Table 144

Reciprocal Category System
Correlations with Pupil Data for Second Grade[1]

Factors	Conc.	Skill		Abstract		Days Abs.
		Ind.	Group	Ind.	Group	
1. Varied Pupil Initiated Interaction vs Response to Teacher	-.24	-.47*	-.38	-.21	-.00	-.11
2. Teacher Response and Amplification	-.27	-.37	-.45*	-.16	.03	-.33
3. Drill	.30	.25	.26	.30	-.07	.16
4. Teacher Direction and Criticism vs Teacher Indirect	.05	.30	.39	.17	-.05	.24
5. Extended Teacher Talk	.10	.37	.22	.04	.44*	-.16
6. Pupil Talk	-.23	-.08	-.03	.04	-.11	-.01
7. Teacher Acceptance vs Teacher Correction	.03	.05	-.00	-.02	.12	-.16
8. Supportive Pupil Talk	-.16	-.10	-.16	.14	.25	-.30
9. Teacher-Pupil Interaction in Accepting Climate	.25	-.01	.17	.18	.23	-.02

[1]N = 20 classrooms *p < .05

Taxonomy of Cognitive Behavior

Across the four grade levels as a whole (Tables 145 through 152), there were several factors which appeared to relate in reasonable fashion.

Applying Previous Learning related positively at kindergarten and entering first grade but not at the other levels. Academic Skills also related positively at kindergarten and entering first, but negatively or not at all at nonentering first and second. The low level activities the factor identifies (counting, comparing letters, etc.) make this seem reasonable as no longer functional at the higher grade levels. Information Giving and Receiving was another factor for which the relationship seemed to change across grade levels. At kindergarten and entering first it was not related to gain, but at nonentering first and second grades it was generally negatively related.

In the second grade data, naming related negatively with Group Abstract gain--perhaps, again, an activity which is too simple to support a complex growth measure at this grade. The unnamed factor related positively with Group Abstract, and although unnamed, the factor involves making comparisons, and all of the synthesis activities, which are relatively high in cognitive level.

Although not completely consistent, there does seem to be evidence here for more complex activities relating to more complex growth measures, and for the activity which relates to growth changing from kindergarten to second grade. The data suggest that some teachers were continuing lower level activities beyond the point where they were functional for growth.

Global Ratings and Classroom Description

Several factors from the GRCD showed reasonable trends across the four grade levels (Tables 153 through 160). An informal classroom organization related negatively with gain at nonentering first and second grade, but not at the two lower grade levels. Structured Learning Without the Teacher versus With the Teacher related negatively with gain at all levels but entering first, where again the mean level was lower than for the other three; that is, more time with the teacher was associated with greater gain except where structured learning with the teacher was already high.

Climate did not seem consistently related across grade level groups, with positive relationships at kindergarten and second grade, but not for the other two groups.

The data for Percent Nonwhite seem too contradictory across measures and grade level groups to interpret.

Time versus Space apparently contrasts schools where all children in the school ride the bus and have the same hours, with schools where

Table 145

Taxonomy of Cognitive Behavior
Means and Standard Deviations for Kindergarten[1]

Factors	$\bar{X}$	S
1. Memory	50.24	7.01
2. Applying Previous Learning	49.21	6.83
3. Reading	45.82	6.21
4. Naming	50.79	6.62
5. Academic Skills	49.09	6.12
6. Unnamed	52.10	5.84
7. Classification	50.64	5.37
8. Information Giving and Receiving	49.37	4.64

[1]N = 54 classrooms

Table 146

Taxonomy of Cognitive Behavior
Correlations with Pupil Data for Kindergarten

Factors	Conc.[2]	Skill[1]	Abst.[1]	Days Abs.[1]
1. Memory	-.11	.14	.13	.06
2. Applying Previous Learning	.34*	.25	.22	.00
3. Reading	.10	.49**	.36**	-.07
4. Naming	.16	.19	-.02	-.05
5. Academic Skills	.22	.27*	.29*	.20
6. Unnamed	.24	.03	.18	.22
7. Classification	-.17	-.15	-.07	-.18
8. Information Giving and Receiving	.01	.02	-.04	.08

[1]N = 54 classrooms

[2]N = 49 classrooms

*$p < .05$

**$p < .01$

Table 147

Taxonomy of Cognitive Behavior
Means and Standard Deviations for Entering First Grade[1]

Factors	$\bar{X}$	S
1. Memory	47.59	10.74
2. Applying Previous Learning	53.18	7.68
3. Reading	52.01	5.23
4. Naming	49.28	7.12
5. Academic Skills	53.86	5.81
6. Unnamed	52.10	7.36
7. Classification	49.71	6.11
8. Information Giving and Receiving	48.80	5.56

[1]N = 20 classrooms

Table 148

Taxonomy of Cognitive Behavior
Correlations with Pupil Data for Entering First Grade[1]

Factors	Conc.	Skill	Abstract		Days
			Ind.	Group	Abs.
1. Memory	-.07	-.43	.32	.03	-.02
2. Applying Previous Learning	.05	.61**	-.00	.07	-.07
3. Reading	-.13	.05	-.26	.06	-.26
4. Naming	.17	.34	.23	-.03	.04
5. Academic Skills	.13	-.03	.61**	.00	.05
6. Unnamed	.28	-.16	.30	.07	.31
7. Classification	-.25	.19	-.08	-.26	.28
8. Information Giving and Receiving	.09	.01	-.02	-.32	.04

[1]N = 20 classrooms

**$p < .01$

Table 149

Taxonomy of Cognitive Behavior

Means and Standard Deviations for Nonentering First Grades[1]

Factors	$\bar{X}$	S
1. Memory	52.05	8.31
2. Applying Previous Learning	49.47	7.06
3. Reading	51.29	5.84
4. Naming	49.89	7.11
5. Academic Skills	50.37	5.78
6. Unnamed	48.43	5.15
7. Classification	51.01	6.41
8. Information Giving and Receiving	50.01	5.33

[1]N = 50 classrooms

Table 150

Taxonomy of Cognitive Behavior

Correlations with Pupil Data for Nonentering First Grades

Factor	Group			Individual			Days Abs.[1]
	Conc.[1]	Skill	Abst.[1]	Conc.[2]	Skill[1]	Abst.[1]	
1. Memory	-.06	.26	.19	-.31*	.63**	-.09	-.32*
2. Applying Previous Learning	-.13	-.11	.15	.14	-.08	.16	.02
3. Reading	.19	.34*	.37**	-.03	.43**	.13	-.06
4. Naming	-.20	-.24	-.12	.02	-.03	-.25	-.07
5. Academic Skills	-.27*	.16	-.05	-.17	.18	-.12	-.08
6. Unnamed	.00	.11	.20	.00	-.02	-.11	-.05
7. Classification	.20	-.01	.07	.12	.20	.14	.05
8. Information Giving and Receiving	-.07	-.31*	-.28*	.05	-.27*	-.35**	.14

[1]N = 50 classrooms. [2]N = 47 classrooms. *$p < .05$. **$p < .01$.

Table 151

Taxonomy of Cognitive Behavior
Means and Standard Deviations for Second Grade[1]

Factors	$\bar{X}$	S
1. Memory	50.95	6.73
2. Applying Previous Learning	49.32	6.35
3. Reading	49.49	5.39
4. Naming	46.30	7.12
5. Academic Skills	49.35	5.76
6. Unnamed	49.60	5.65
7. Classification	48.39	5.38
8. Information Giving and Receiving	49.63	5.07

[1]N = 20 classrooms

Table 152

Taxonomy of Cognitive Behavior
Correlations with Pupil Data for Second Grade[1]

Factors	Conc.	Skill		Abstract		Days Abs.
		Ind.	Group	Ind.	Group	
1. Memory	.23	-.08	-.11	.14	-.18	.12
2. Applying Previous Learning	.17	.30	.12	.03	.07	-.18
3. Reading	-.09	-.18	-.01	-.05	-.03	.43
4. Naming	-.04	.19	-.27	.04	-.56**	-.11
5. Academic Skills	.01	-.00	.24	-.09	-.09	.18
6. Unnamed	.20	-.29	.33	.14	.46*	.11
7. Classification	-.09	.38	.27	.05	.23	-.15
8. Information Giving and Receiving	.10	-.25	-.40	-.27	-.46*	.09

[1]N = 20 classrooms

*p < .05
** p < .01

Table 153

Global Ratings and Classroom Description Factors
Means and Standard Deviations for Kindergarten[1]

Factors	$\bar{X}$	S
1. Informal vs Formal Classroom Organization	52.82	3.98
2. Climate	50.02	5.91
3. Structured Learning Without the Teacher vs with the Teacher	49.70	6.58
4. Percent Nonwhite	51.16	6.06
5. Time vs Space	43.62	7.27
6. Unstructured vs Structured Time	52.78	9.27

[1]N = 54 classrooms

Table 154

Global Ratings and Classroom Description Factors
Correlations with Pupil Data for Kindergarten

Factors	Conc.[2]	Skill[1]	Abst.[1]	Days Abs.[1]
1. Informal vs Formal Classroom Organization	-.05	-.22	-.12	-.08
2. Climate	.10	.28*	.28*	-.22
3. Structured Learning Without the Teacher vs with the Teacher	-.34*	-.49**	-.37**	.01
4. Percent Nonwhite	.24	.12	.14	.17
5. Time vs Space	.01	.49**	.12	.02
6. Unstructured vs Structured Time	-.12	-.41**	-.20	-.08

[1]N = 54 classrooms

[2]N = 49 classrooms

*$p < .05$

**$p < .01$

Table 155

Global Ratings and Classroom Description Factors
Means and Standard Deviations for Entering First Grade[1]

Factors	$\bar{X}$	S
1. Informal vs Formal Classroom Organization	47.99	4.86
2. Climate	50.87	4.58
3. Structured Learning Without the Teacher vs with the Teacher	48.35	6.43
4. Percent Nonwhite	47.36	5.27
5. Time vs Space	56.99	5.46
6. Unstructured vs Structured Time	46.82	4.57

[1]N = 20 classrooms

Table 156

Global Ratings and Classroom Description Factors
Correlations with Pupil Data for Entering First Grade[1]

Factors	Conc.	Skill	Abstract		Days Abs.
			Ind.	Group	
1. Informal vs Formal Classroom Organization	.36	.45	.09	.22	-.51*
2. Climate	.11	.30	.02	-.01	-.41
3. Structured Learning Without the Teacher vs with the Teacher	.15	.12	-.08	-.02	.25
4. Percent Nonwhite	-.39	-.05	-.52*	.21	-.32
5. Time vs Space	-.66**	.25	-.50*	-.38	-.05
6. Unstructured vs Structured Time	.26	.03	.33	-.11	.28

[1]N = 20 classrooms

*$p < .05$

**$p < .01$

Table 157

Global Ratings and Classroom Description Factors
Means and Standard Deviations for Nonentering First Grades[1]

Factors	$\bar{X}$	S
1. Informal vs Formal Classroom Organization	49.08	5.06
2. Climate	50.08	5.96
3. Structured Learning Without the Teacher vs with the Teacher	50.39	8.42
4. Percent Nonwhite	52.15	6.42
5. Time vs Space	52.87	5.13
6. Unstructured vs Structured Time	48.69	7.88

[1]N = 50 classrooms

Table 158

Global Ratings and Classroom Description Factors
Correlations with Pupil Data for Nonentering First Grades

Factors	Group			Individual			Days
	Conc.[1]	Skill[1]	Abst.[1]	Conc.[2]	Skill[1]	Abst.[1]	Abs.[1]
1. Informal vs Formal Classroom Organization	-.33*	-.44**	-.19	.01	-.53**	-.28*	-.08
2. Climate	-.23	.05	.05	-.18	.23	.02	-.26
3. Structured Learning Without the Teacher vs with the Teacher	-.11	-.32*	-.21	.02	-.37**	-.30*	-.19
4. Percent Nonwhite	.34*	.08	-.08	.44**	-.16	.33*	.29*
5. Time vs Space	.34*	.24	.07	.13	.26	.18	.02
6. Unstructured vs Structured Time	-.18	-.43**	-.32*	.14	-.46**	-.37**	-.06

[1]N = 50 classrooms

[2]N = 47 classrooms

*$p < .05$

**$p < .01$

Table 159

Global Ratings and Classroom Description Factors
Means and Standard Deviations for Second Grade[1]

Factors	$\bar{X}$	S
1. Informal vs Formal Classroom Organization	48.26	6.04
2. Climate	49.19	6.74
3. Structured Learning Without the Teacher vs with the Teacher	48.59	10.68
4. Percent Non white	50.64	5.73
5. Time vs Space	54.50	5.16
6. Unstructured vs Structured Time	49.61	8.53

[1]N = 20 classrooms

Table 160

Global Ratings and Classroom Description Factors
Correlations with Pupil Data for Second Grade[1]

Factors	Conc.	Skill		Abstract		Days Abs.
		Ind.	Group	Ind.	Group	
1. Informal vs Formal Classroom Organization	.06	-.32	-.52*	-.22	-.04	-.42
2. Climate	.14	.45*	.43	.47*	.25	-.05
3. Structured Learning without the Teacher vs with the Teacher	.40	-.54*	-.64**	-.47*	-.23	-.18
4. Percent Nonwhite	.12	.04	-.20	-.26	-.48*	.23
5. Time vs Space	-.44*	.30	.37	.16	-.04	.22
6. Unstructured vs Structured Time	.35	-.49*	-.63**	-.55*	-.20	-.15

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hours differ by grade level and where rooms are larger. This factor related positively with gain in kindergarten and nonentering first grade (which are the same school systems to a considerable degree), but strongly negatively for entering first grade, where the school day was longest, and a negative relation in second grade. So the factor appears to relate positively with gain where the days are shorter, and negatively where the days are longer. Apparently, the school day can be too long for six-year-olds.

The factor Unstructured versus Structured Time related negatively with gain (which means that structured time was associated with gain) except for entering first grade, where the amount of structured time was highest.

The agreement of these several trends with data reported for the previous instruments is considerable, with numbers of relations suggesting the association of structured activity (and time with the teacher) and pupil cognitive growth.

Relation of Days Absent

The relationships between pupil regressed gain and mean number of days absent for the two larger samples, using the classroom as the unit of analysis, are shown in Table 161. There is one significant positive correlation for Individual Concrete for nonentering first grade which indicates that as pupil growth increases, days absent also increase. There is a negative correlation almost as high and only one more positive than negative correlation, so that a reasonable conclusion probably is that the correlation with growth is really zero, and these are chance variations. But even this conclusion is a rather surprising one. A reasonable expectation would be that the classroom conditions which produced most growth were ones which would also lead pupils to attend school more, so that the relations would be expected to be negative. Or alternatively, when pupils are absent more they would be expected to learn less. Of course it may be that a negative relationship would be obtained if the pupil were used as the unit of analysis, but since the gain measures can only be treated as classroom means in relating them to measures of classroom process, this appears to be the relevant analysis to describe the relation between these two classes of variables as they are related to classsroom measures.

In summary, there was no clear evidence of fewer days absent being related to gain, which seems surprising.

Interactions of Process Measures with Gain

It will be recalled that a number of measures of classroom behavior either failed to relate in the expected direction with pupil gain, or related in the opposite direction. Teacher Positive Affect, for example, related near zero in kindergarten, positively with Individual Abstract in entering first grade, negatively with Concrete and Individual Abstract at nonentering first grade, and essentially zero at second grade. One of the possible

Table 161

Relations of Classroom Mean Days Absent to Mean Pupil Gain

Kindergarten			Nonentering First Grade		
Measure	N	r	Measure	N	r
Concrete	49	-.07	Group Concrete	50	.21
Skill	54	-.06	Group Skill	50	-.10
Abstract	54	.01	Group Abstract	50	.04
			Individual Concrete	46	.30*
			Individual Skill	50	-.25
			Individual Abstract	50	.20

*$p < .05$

explanations for these unexpected and contradictory results could be the interaction of other variables with this one. For example, if structure is related to gain (as the data suggest), and if positive affect is found more often in less structured classrooms, then the influence of structure might mask the influence of positive affect.

In order to examine such possibilities, a number of process variables which appeared to reflect positive affect, structuring, controlling, or subject matter focus were tested for the existence of an interaction between the variables, taken two at a time. The analyses were carried out using stepwise multiple regression, entering the product term (which tests for interaction) following the entry of the two measures themselves as main effects (Walberg, 1971). The sample was nonentering first grade, since that was one of the two largest, and represents other grade levels better than kindergarten. Mean classroom regressed gain for the Group Skill and Group Abstract measures were used as dependent variables. The process measures tested were: FLACCS 2 X FLACCS 9, FLACCS 5 X FLACCS 9, FLACCS 6 X FLACCS 9, TPOR 1 X FLACCS 9, TPOR 2 X TPOR 5, TPOR 5 X FLACCS 9, TPOR 5 X RCS 8, RCS 8 X FLACCS 9, Cog Tax 3 X FLACCS 2, Cog Tax 3 X FLACCS 9, Cog Tax 8 X FLACCS 2.

Most of the interactions were not significant, but two reached significance at the five percent level and two at the one percent level. Since the basic correlations have already been presented, and convey degree of relationship as well as significance level, the usual tables of sums of squares and mean squares will not be presented. Rather the interactions are plotted, and the significance level and variance accounted for by the interaction beyond that of the main effects will be given.

Interactions With Group Skill

The interaction of TPOR 2, Experimental Teaching, and TPOR 5, Pupil Free Choice vs Teacher Structured Activity is shown in Figure 20; it is significant at the one percent level, and accounts for 14 percent of the variance in gain in addition to that for the variables singly. The effect of three of the combinations of conditions can be interpreted without difficulty, but the fourth presents problems. Low gain was associated with low Experimental Teaching and high Teacher Structure (for simplicity, only one pole of the bipolar factor is named). Low gain was also associated with Experimental Teaching and Pupil Freedom. One high gain condition is the combination of Teacher Structure and Experimental Teaching, which suggests the usefulness of a structured setting in which pupil choice of activity is not prominent, but in which the teacher provides an "open" kind of focus on the task problem: is actively involved, asks questions which require processing information rather than retrieving, leads the pupil to a problem which stumps him, questions misconceptions, helps correct errors, asks pupil to judge the comparative value of answers, etc. The interpretation so far suggests that high gain is found in association with high teacher structure and Experimental Teaching but not in the absence of either.

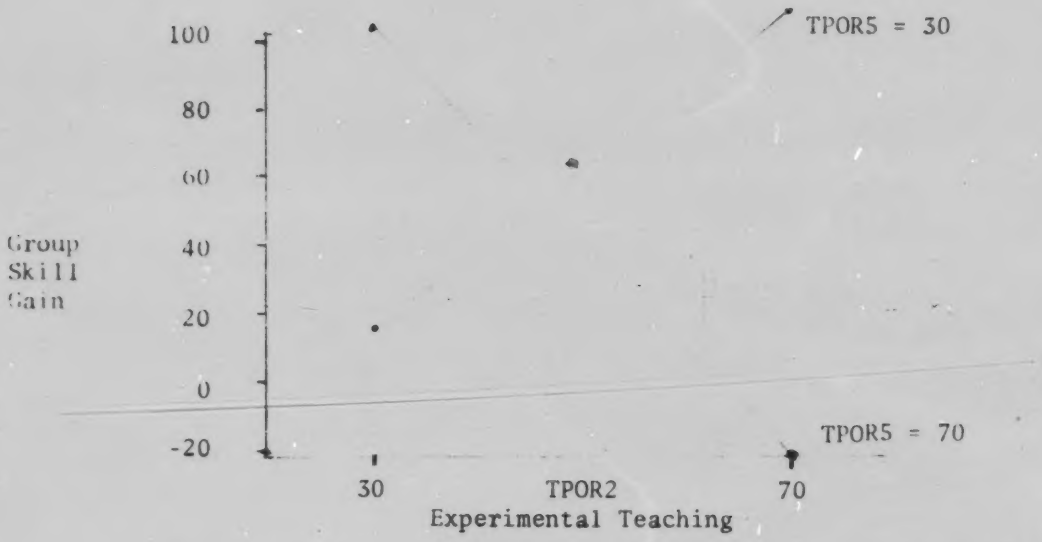

Figure 20: The Interactions of TPOR2, Experimental Teaching, and TPOR5, Pupil Free Choice vs Teacher Structured Activity with Group Skill.

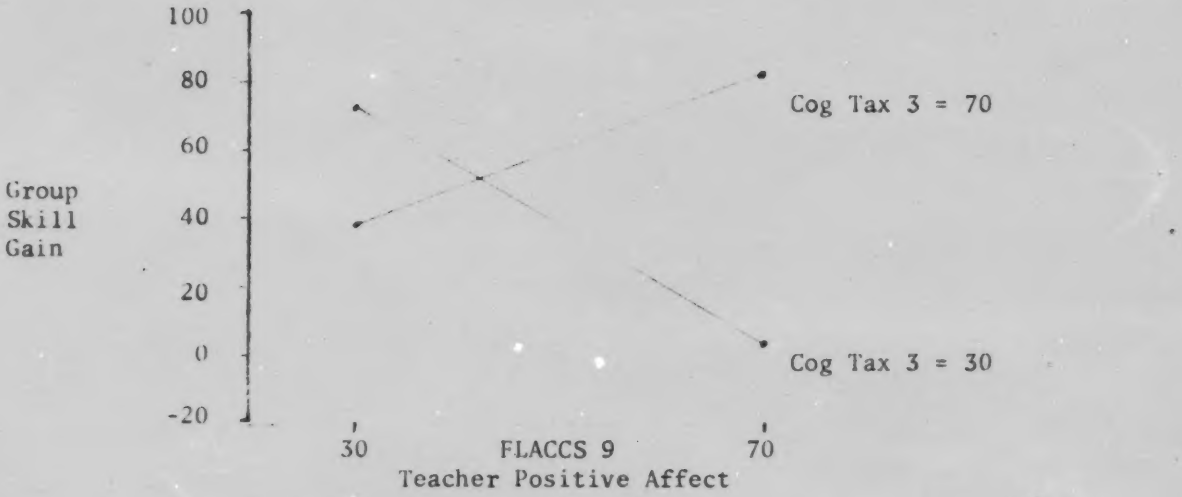

Figure 21: The Interaction of FLACCS 9, Teacher Positive Affect, and Cog Tax 3, Reading, with Group Skill.

The problem in interpretation is the other high gain condition in which Pupil Freedom and nonexperimental teaching are associated with high gain. Both conditions indicated as necessary above, are absent. Neither the "open" focus of Experimental Teaching nor Teacher Structure is present. High gain in this condition is perplexing. Perhaps these two measures indicate the absence of two kinds of teacher behavior, but fail to indicate a different kind of behavior which is occurring. Or, perhaps this is an "empty cell" which is the other end of a regression line, one end of which is fitted to real occurrences (the correlation between these two process variables is .56 [Table 31, p 61], indicating that Experimental Teaching tends to occur in the context of Pupil Freedom). It seems relevant that the preponderance of zero order correlations suggests an association between structure and gain.

Figure 21 presents the interaction of FLACCS 9, Teacher Positive Affect, with Cog Tax 3, Reading, as they relate to gain in Group Skill. The result is significant at the five percent level, and accounts for seven percent of the variance in the gain variable. High positive affect is associated with high gain only when there is also considerable emphasis on reading. In the absence of the emphasis on reading, high positive affect is associated with low gain in Group Skill. The suggestion, then, is that positive affect in the context of a task orientation may be functional, but not in the absence of such a focus (at least as far as this gain measure is concerned).

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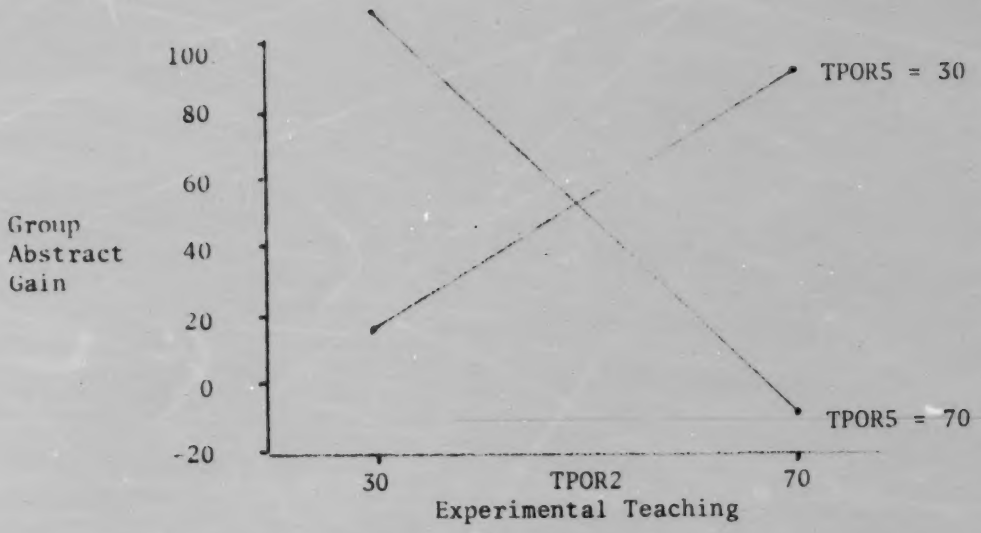
Figure 23 presents the interaction of FLACCS 2, Pupil Free Choice vs No Choice with Cog Tax 3, Reading, as they relate to gain in Group Abstract. The interaction accounts for four percent of the variance in gain, and is significant at the five percent level. The direction of the relationship indicates that high gain is associated with high Pupil Freedom and a high emphasis on reading; with no pupil choice, intermediate amounts of gain occurred, but the presence or absence of reading emphasis made little difference, and least gain occurred with high Pupil Freedom and low emphasis on reading.

The interpretation of these results should be tempered by the fact that they represent four findings out of 24 tests run, so that one result significant at the five percent level would be expected by chance. But the fact that four significant results were obtained, two of which reached the one percent level, suggests that real effects may be present. And



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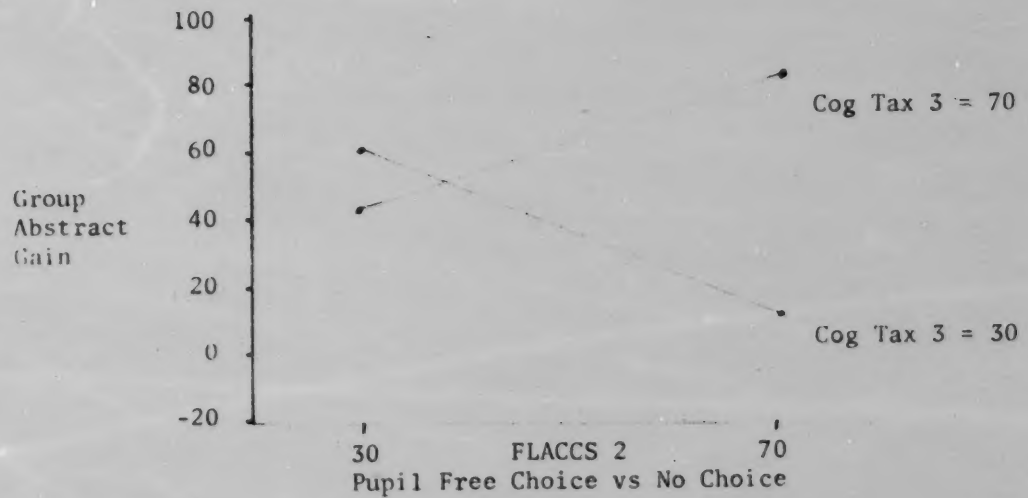

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Relations between Observation Measures and Change in Pupil Attitude

The relations between the observation measures and change in pupil attitude toward school are shown in Table 162 for all grade levels, there does seem to be a trend in the data: The number of significant correlations for entering first grade, and the consistency of the meaning of their direction. The meaning appears to be that these pupils are happiest or like school best when the task is simple, well structured, and under the direction of the teacher. Their attitudes are most positive in association with Convergent Teaching, Teacher Discouragement of Exploration, Textbook Learning instead of Exploration of Ideas, Responding to the Teacher rather than Initiating, and with Memory level learning rather than Applying Previous Learning. Although speculative, it seems possible that these pupils, who enter school at first grade, and who have subject-matter demands placed on them from the beginning of this new experience, are most comfortable with a "simplified" environment.

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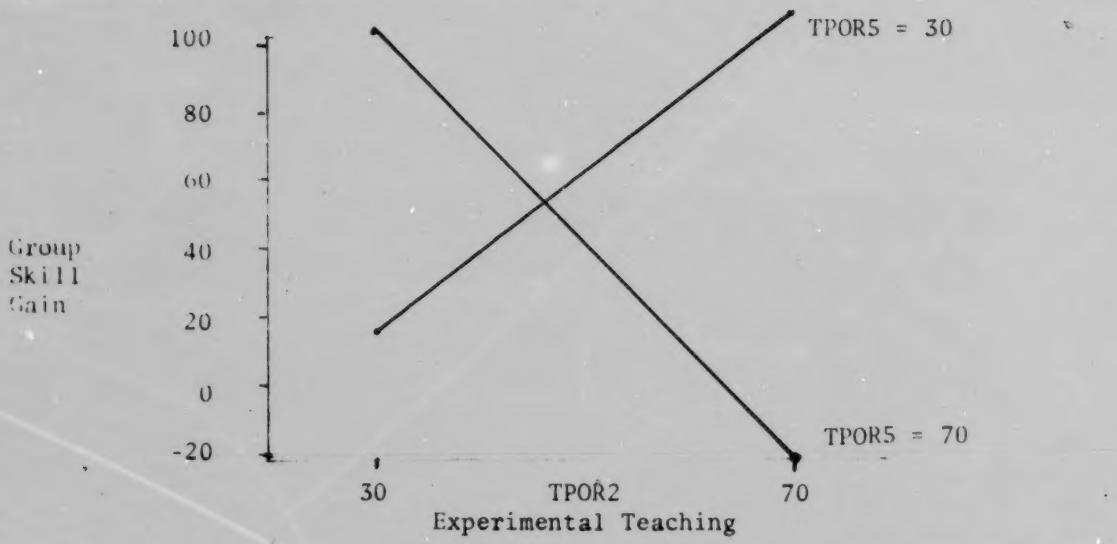

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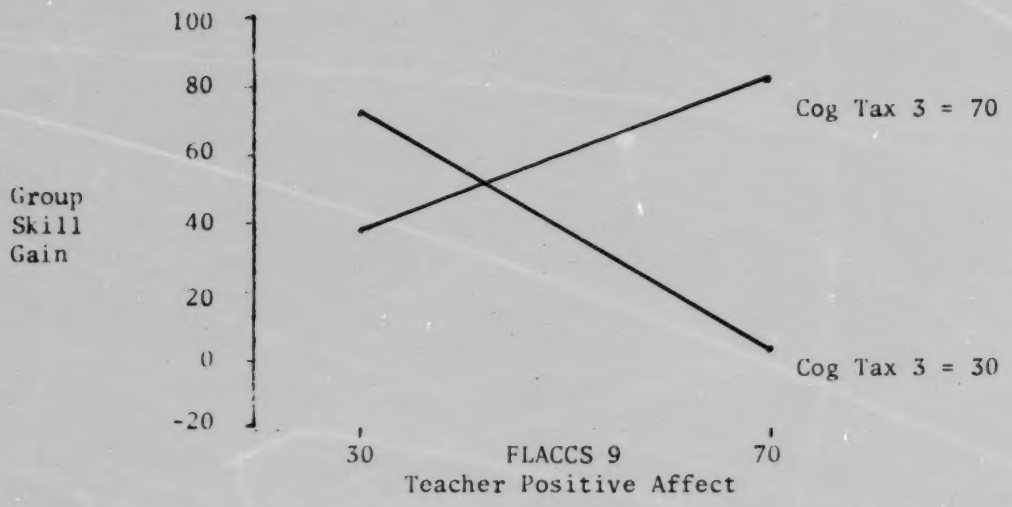

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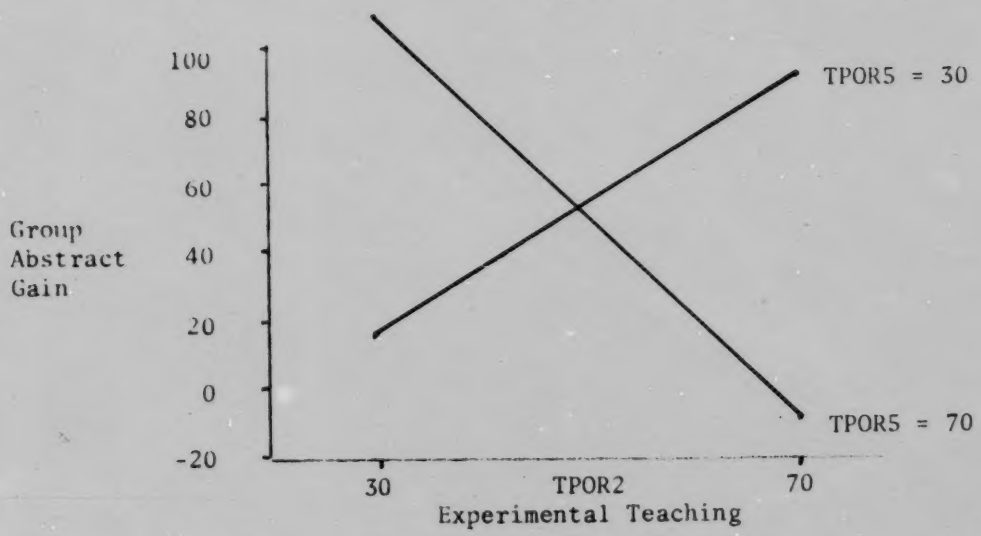

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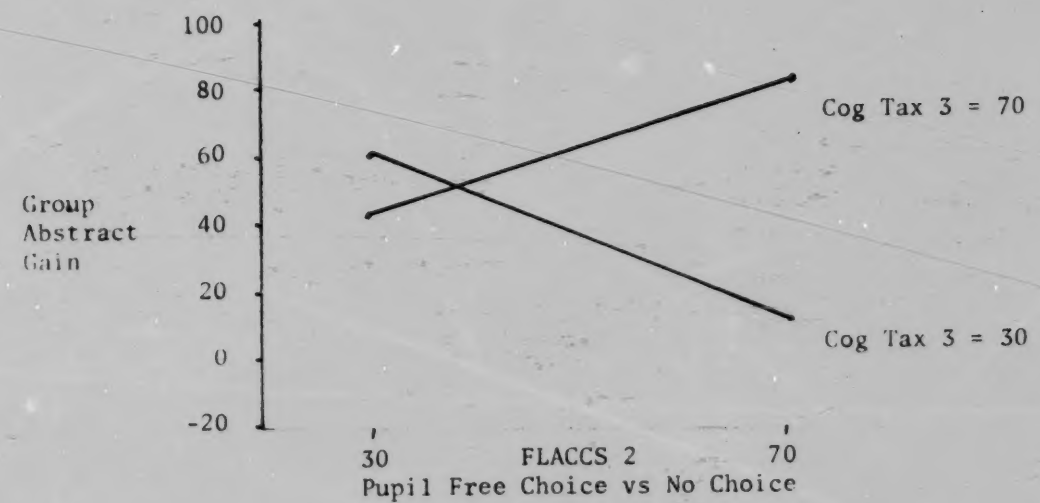

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Table 162

Relations Between Classroom Behavior Measures and Change in Pupil Attitude

Behavior Measure	Grade Level			
	Kinder-garten N=59	Entering First N=21	Non-Ent-ering First N=60	Second N=25
Florida Climate and Control System				
1. Strong Control	.01	-.18	.14	.01
2. Pupil Free Choice vs No Choice	.12	-.37	-.08	-.20
3. Teacher-Pupil Supportive Behavior	.20	-.16	.02	-.24
4. Nonverbal Gentle Control	.21	.21	.03	-.05
5. Gentle Control	-.05	-.13	.16	.05
6. Work Without Teacher	.01	-.26	.03	-.37
7. Pupil Negative Affect	.10	-.17	.06	-.22
8. Teacher Attention in a Task Setting	-.10	-.22	.28*	-.09
9. Teacher Positive Affect	-.02	-.10	.02	-.18
Teacher Practices Observation Record				
1. Convergent Teaching	.04	.44*	.06	-.00
2. Experimental Teaching	.03	-.26	-.15	-.30
3. Teacher Discourages Exploration	.03	.54*	.21	-.06
4. Undifferentiated Teaching	.09	-.39	.11	.27
5. Pupil Free Choice vs Teacher Structured Activity	.21	-.42	-.27*	-.22
6. Unnamed	.14	-.25	.14	.18
7. Exploration of Ideas vs Textbook Learning	.12	-.45*	-.25*	-.28

Table 162 Continued

	Grade Level			
	Kinder-garten	Entering First	Non-Entering First	Second
Reciprocal Category System				
1. Varied Pupil Initiated Interaction vs Response to Teacher	.19	-.51*	-.10	-.39
2. Teacher Response and Amplification	-.16	-.33	-.16	-.27
3. Drill	-.19	.37	.16	-.10
4. Teacher Direction and Criticism vs Teacher Indirect	-.12	.04	-.11	.24
5. Extended Teacher Talk	.15	-.22	.00	-.15
6. Pupil Talk	.03	-.24	.01	-.18
7. Teacher Acceptance vs Teacher Correction	.12	.06	.27*	-.01
8. Supportive Pupil Talk	-.03	-.34	-.19	-.13
9. Teacher-Pupil Interaction in Accepting Climate	-.15	.03	-.17	-.25
Taxonomy of Cognitive Behavior				
1. Memory	-.08	.52*	.09	.02
2. Applying Previous Learning	-.11	-.52*	-.03	.12
3. Reading	-.16	-.18	.06	.22
4. Naming	-.01	-.16	.08	-.25
5. Academic Skills	-.04	-.19	.17	.17
6. Unnamed	.04	-.32	.23	.11
7. Classification	-.13	.15	-.14	-.39
8. Information Giving and Receiving	-.02	.03	.04	-.01
Global Ratings and Classroom Description Measures				
1. Informal vs Formal Classroom Organization	.30*	-.19	-.21	-.23
2. Climate	-.22	.06	-.07	.06
3. Structured Learning Without the Teacher vs with the Teacher	.38**	-.37	-.12	-.08
4. Percent Nonwhite	-.06	.33	.01	.21
5. Time vs Space	-.29*	-.10	.02	.19
6. Unstructured vs Structured Time	.25	-.33	-.17	-.04

* $P < .05$
** $P < .01$

are met at once. But by second grade these influences appear to have lost their negative effect.

Differences in Pupil Gain Associated With Profiles

It seemed useful to test whether pupils experiencing the different patterns of teaching identified by the profile analysis gained in achievement at differing rates. To test this, the nonentering first grade classrooms which made up each profile were identified, and the mean gain for pupils on each of the measures was entered into analysis. The classroom was used as the unit of analysis. Where a classroom was included in more than one profile, it was placed with that profile for which its "d" was smallest, and only entered there.

Only 43 classrooms were available which were observed as nonentering first grade and for which pupil achievement data were available. One of the profiles included six teachers, five profiles included three, six profiles included two teachers, and ten teachers were not in any profile. Although the means often differed from each other by 20 points or more on the T score scale, the differences were not significant in any case when tested by single factor analysis of variance. While this is not evidence that some patterns of teaching are associated with greater gain than others, when such differences in means are not significant, the results do not minimize the usefulness of the analysis, either. Profile analysis appears to be a promising tool for further application in classroom observation: 1) in relating profiles to differences in gain, given a larger number of classrooms; and 2) in testing the degree to which a sponsor was successful in creating the pattern of classroom behavior be identified as desirable.

Summary of Relations of Classroom Measures to Pupil Growth

These data relating pupil growth to classroom process differ in important ways from previous findings. Where past results showed greater amounts of freedom to be related to greater amounts of pupil growth, in general, these data show the opposite (although the interactions do qualify that conclusion). Where the Group Abstract measure related more strongly to classroom process in the past, the skill measure was the one which was more frequently and more strongly related in these data, and Concrete and Abstract related less often. Whereas measures reflecting freedom were more likely to relate to pupil abstract growth and only a measure reflecting very narrow structuring related to concrete growth in the previous data, there was no discernible trend for such a differentiation in these data. (These comparisons apply to data collected in 1968-69 vs 1970-71 data, since the 1969-70 pupil data were too limited to lead to very clear conclusions).

Past results from several studies have supported a concept identified as the inverted "U" hypothesis (Soar, 1972, and Soar and Soar, 1972), which suggests that measures of classroom behavior involving freedom or

Table 162

Relations Between Classroom Behavior Measures and Change in Pupil Attitude

Behavior Measure	Grade Level			
	Kinder-garten N=59	Entering First N=21	Non-Entering First N=60	Second N=25
Florida Climate and Control System				
1. Strong Control	.01	-.18	.14	.01
2. Pupil Free Choice vs No Choice	.12	-.37	-.08	-.20
3. Teacher-Pupil Supportive Behavior	.20	-.16	.02	-.24
4. Nonverbal Gentle Control	.21	.21	.03	-.05
5. Gentle Control	-.05	-.13	.16	.05
6. Work Without Teacher	.01	-.26	.03	-.37
7. Pupil Negative Affect	.10	-.17	.06	-.22
8. Teacher Attention in a Task Setting	-.10	-.22	.28*	-.09
9. Teacher Positive Affect	-.02	-.10	.02	-.18
Teacher Practices Observation Record				
1. Convergent Teaching	.04	.44*	.06	-.00
2. Experimental Teaching	.03	-.26	-.15	-.30
3. Teacher Discourages Exploration	.03	.54*	.21	-.06
4. Undifferentiated Teaching	.09	-.39	.11	.27
5. Pupil Free Choice vs Teacher Structured Activity	.21	-.42	-.27*	-.22
6. Unnamed	.14	-.25	.14	.18
7. Exploration of Ideas vs Textbook Learning	.12	-.45*	-.25*	-.28

Table 162 Continued

	Grade Level			
	Kinder-garten	Entering First	Non-Entering First	Second
Reciprocal Category System				
1. Varied Pupil Initiated Interaction vs Response to Teacher	.19	-.51*	-.10	-.39
2. Teacher Response and Amplification	-.16	-.33	-.16	-.27
3. Drill	-.19	.37	.16	-.10
4. Teacher Direction and Criticism vs Teacher Indirect	-.12	.04	-.11	.24
5. Extended Teacher Talk	.15	-.22	.00	-.15
6. Pupil Talk	.03	-.24	.01	-.18
7. Teacher Acceptance vs Teacher Correction	.12	.06	.27*	-.01
8. Supportive Pupil Talk	-.03	-.34	-.19	-.13
9. Teacher-Pupil Interaction in Accepting Climate	-.15	.03	-.17	-.25
Taxonomy of Cognitive Behavior				
1. Memory	-.08	.52*	.09	.02
2. Applying Previous Learning	-.11	-.52*	-.03	.12
3. Reading	-.16	-.18	.06	.22
4. Naming	-.01	-.16	.08	-.25
5. Academic Skills	-.04	-.19	.17	.17
6. Unnamed	.04	-.32	.23	.11
7. Classification	-.13	.15	-.14	-.39
8. Information Giving and Receiving	-.02	.03	.04	-.01
Global Ratings and Classroom Description Measures				
1. Informal vs Formal Classroom Organization	.30*	-.19	-.21	-.23
2. Climate	-.22	.06	-.07	.06
3. Structured Learning Without the Teacher vs with the Teacher	.38**	-.37	-.12	-.08
4. Percent Nonwhite	-.06	.33	.01	.21
5. Time vs Space	-.29*	-.10	.02	.19
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Past results from several studies have supported a concept identified as the inverted "U" hypothesis (Soar, 1972, and Soar and Soar, 1972), which suggests that measures of classroom behavior involving freedom or

control of pupils, defined in various ways, tend to have nonlinear relationships with pupil gain. The shape of the relationship is one in which increasing freedom, however defined, has led to increasing pupil growth up to a point, but beyond that point, increasing freedom has led to less growth rather than more. Further, the point at which most growth occurred has tended to move in the direction of increased pupil freedom as the pupil growth measure became more complex or abstract. When curves were plotted for the current data, inverted "U's" were found in some cases, but upright "U's" were found at least as frequently. As an example, FLACCS 1, Strong Control, was associated with most pupil growth for all five of the pupil measures which were plotted when Strong Control was either at a maximum or at a minimum, but with least growth when it was at an intermediate value.

When results differ from study to study as these have, one likely posibility is the presence of a significant interacting variable which is not being recognized. It seems probable that the sample from which these data were obtained differs in important ways from previous samples, but at this point the nature of the differences is not known. Little work has been published in which systematic observation measures have been related to measures of growth of disadvantaged pupils. The earlier data from this project agreed with the larger body of work in which advantaged pupils, often from affluent suburban schools, were studied. These results do not. Rather, they agree with the expectations of some theorists that disadvantaged pupils should need larger amounts of structure or control to maximize learning than would be true for middle or upper class pupils.

When the interactions of numbers of the classroom observation measures reflecting expression of positive affect or structuring behavior were tested, few were significant. The significant ones gave limited support to the idea that pupil freedom or teacher positive affect on one dimension, associated with structure or task orientation on the other, was accompanied by increased gain; but even this finding was not without question.

Another possible reason for the differences in results from the previous data to these may be the loss of high prescoring pupils in the current data and the limited gain possible for others. Beyond this, regressed gain was calculated separately for the four subgroups of nonwhite and white, qualified and not qualified for Follow Through Services. Because of the lack of sufficient data to permit it, this refinement of analysis was not possible in the previous data. Rather, regressed gain was calculated for the total group (which would parallel the typical covariance analysis). It seems possible, then, that the results reported here may be the "right" results and the others in error, even though they agreed with the larger body of findings from advantaged pupils.

Few relationships were entirely consistent across all grade levels, but some trends appeared to agree across instruments. Probably selecting, integrating, and summarizing is always subjective to a degree.

Given these uncertainties, the major trend of relationships between classroom behavior and pupil growth for this sample of pupils were as follows:

1. Probably the most consistent finding was a relation between a number of factors from the five instruments indicating that greater amounts of teacher control, structure, focus, and convergence, or lesser amounts of pupil freedom, exploration of ideas, or experimental teaching led to increased pupil cognitive growth, especially in the skill measures.

2. Factors reflecting both positive and negative affect expression tended to relate negatively to pupil gain, but greater amounts of either tended to occur in less structured settings so that it seemed possible that structure rather than affect might be the influential variable in these results. Tests of interactions gave only limited support for this interpretation.

3. There was some evidence of the nature of activities which related positively to gain changing across grade level. Lower cognitive level activities which related positively at the lower grades either did not relate or related negatively at higher grade levels. This suggested that teachers carried simple activities past the point at which they were functional.

4. Work in interaction with the teacher tended to relate positively with gain, whereas work without the teacher or an adult -- independent work -- tended to relate negatively.

5. One of the strongest relations in the study suggested that a long school day for entering first graders is negatively associated with gain.

6. Relations between the observation measures and change in attitude toward school were not consistent across grade levels but highly consistent within grades. The differences suggested that a "simple" environment related to positive attitude change for pupils first meeting school or specific subject matter demands.

The existence of changes across grade levels which seemed reasonable may mean that other "real" changes may have been ignored as inconsistencies. The only long run answer is replication.

Overall, results from the factors from instruments with very different theoretical orientations and even rather different kinds of data, agreed to a degree which is encouraging. Although these results do not agree with those from the earlier data, their consistency and the number of pupils and classrooms involved make them difficult to dismiss. The likelihood seems great that these conclusions apply to at least a considerable fraction of the pupils in Follow Through. If there are pupils to whom they do not apply, as the earlier data suggest and as the broader

area of research indicates, an important task for the future will be the identification of the pupil subgroups for whom differing styles of teaching are best.

A Final Word

If we accept the conclusions just stated as representing a beginning toward identifying some aspects of teaching that are effective for disadvantaged pupils, we are still left with problems and qualifications. We have no information here about the effect of differing teaching styles on noncognitive objectives such as self concept, personality, or responsible independence. Nor is there information about whether these results would apply to younger or older pupils, and there are suggestions that some relationships do differ across the grade levels studied here.

Further, the information we have about growth in cognitive objectives is clearest for skill growth, only applies to a single school year, and leaves open the question of longer-term relationships. The importance of this question of longer term effect is underlined by the finding that significant amounts of growth for some pupils occur during the summer, out of school (Soar, 1966; Soar and Soar, 1969; and Hayes and Grether, 1969). The latter suggested that summer growth was the major difference between high and low socio-economic groups in the total amount of growth that occurred in elementary school. The former references indicated that significantly greater amounts of summer growth were associated with an indirect teacher style the preceding school year than with a direct teacher style.

There are differences in the conclusions that are reached in this study about the nature of effective teaching, in contrast to the earlier study, studies with middle and upper class pupils, and the studies of summer growth. These differences make it important to try to integrate these divergent findings into a coherent picture of effective teaching and the long-term goals of education -- an independent, self-directing, responsible individual.

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APPENDICES

Appendix A

Equipment for Classroom Tape Recording

The final procedure involved the use of a moderately priced tape recorder and a Cardiod microphone (so-called because a graph of its sensitivity is somewhat heart-shaped). This class of microphones is broadly sensitive to the front, but sensitivity declines sharply to the rear, with the instrument almost completely insensitive directly to the rear. In use the microphone was not so much directed at the sound to be recorded, but away from competing sounds. In addition, these professional microphones are materially more sensitive than those furnished with tape recorders.

A further increase in recording quality was gained from the use of "high-output" tape which is more sensitive to faint signals.

The choice of batteries for the tape recorder also was an important factor. Full voltage is necessary to obtain the best possible recording. Zinc-acid batteries (ordinary flashlight batteries) begin to decline in voltage after a few minutes' use and decline steadily. GE rechargeable batteries produce only 1.3 volts instead of 1.5 at full charge, so that a set of five batteries in series produces a voltage a full volt below nominal value. Mallory batteries and chargers were selected because they produce full voltage which is sustained for extended periods of time.

A final change was the provision of moderate quality earphones. Stereo earphones, rewired to function monaurally, were found to increase intelligibility over use of the speaker in the recorder, or earphones intended for transcription.

The result of the various changes was that, in general, anything that a live observer could hear and understand in the classroom became codeable from tape.

Appendix B

Reciprocal Category System Measures

Variable	Description
1	Teacher warms, informalizes the climate. The sum of column 1.
2	Teacher accepts. The sum of column 2.
3	Teacher amplifies. The sum of column 3.
4	Teacher elicits. The sum of column 4.
5	Teacher responds. The sum of column 5.
6	Teacher initiates. The sum of column 6.
7	Teacher directs. The sum of column 7.
8	Teacher corrects. The sum of column 8.
9	Teacher cools, formalizes. The sum of column 9.
10	Silence. The sum of column 10.
11	Pupil elicits. The sum of column 14.
12	Pupil responds. The sum of column 15.
13	Pupil initiates. The sum of column 16.
14	Pupil directs. The sum of column 17.
15	Pupil corrects. The sum of column 18.
16	Confusion (does not include uncodeable tape). The sum of column 20.
17	Teacher talk, percent. The sum of columns 1-9 divided by columns 1-9 plus columns 11-19.
18	Teacher acceptance-rejection, percent. The sum of columns 1, 2, and 3 divided by columns 1, 2, and 3 plus 8 and 9.
19	Pupil initiation. The sum of column 16 divided by total student talk. The sum of columns 11-19.
20	Student response to teacher. Rows 1-9 for column 15, divided by total student talk.
21	Pupil-pupil talk. The sum of rows 11-19 for columns 11-19.
22	Teacher extended indirect. The sums of the cells in rows 1, 2, and 3 for columns 1, 2, and 3.
23	Teacher extended direct. The sum of the cells in rows 7-9 for columns 7-9.
24	Teacher revised I/D. This measure involves teacher indirect response (rows 11-19 for columns 1-3), and teacher direct response (rows 11-19 for columns 7-9). The percentage is made up of indirect response divided by indirect response plus direct response.
25	Pupil positive participation, percent. Positive participation divided by positive participation plus negative participation (rows 15 and 16 for columns 11-13/rows 15, 16 for columns 11-13, plus rows 15 and 16 for columns 17-19).
26	Pupil revised I/D_1. This measure includes pupil extended indirect (rows 11-19 for columns 11-13); and pupil extended direct (rows 11-19 for columns 17-19); with pupil extended indirect divided by pupil extended direct, plus pupil extended indirect.

Appendix B - Continued

Variable	Description
27	Teacher narrow question. The sum of the 4-15 cell.
28	Teacher broad question. The sum of the 4-16 cell.
29	Pupil broad question. The sum of the 14-16 cell.
30	Pupil indirect interruption. The sum of row 6, columns 11-13 cells.
31	Pupil substantive interruption. The row 6, columns 17-19 cells.
32	Pupil direct interruption. The row 6, columns 17-19 cells.
33	Total pupil interruption. The sum of pupil substantive interruption plus pupil direct interruption.
34	Pupil question, teacher question. The 14-4 cell.
35	Pupil question, teacher response. The 14-5 cell.
36	Teacher-teacher flexibility. The number of cells in rows 1-9 for column 1-9 which are nonzero. (As percent of possible cells).
37	Teacher-pupil flexibility. The number of cells in the rows 1-9 for columns 11-19 which are nonzero. (As percent of possible cells).
38	Pupil-teacher flexibility. The number of cells in rows 11-19 for column 1-9 which are nonzero. (As percent of possible cells).
39	Pupil-pupil flexibility. The number of cells in rows 11-19 for columns 11-19 which are nonzero. (As percent of possible cells).
40	Total flexibility. The total number of cells in the entire 19x19 matrix (excluding row and column 10) which are nonzero. (As percent of possible cells).
41	Teacher accept-correct, percent. The column 2 total expressed as a percent of the sum of columns 2 and 8.
42	Teacher elicit-initiate, percent. The column 4 total expressed as a percent of columns 4 plus 6.
43	Teacher amplify-direct, percent. The column 3 total expressed as a percent of column 3 plus column 7.
44	Teacher extended question. The 4-4 cell.
45	Steady-state teacher initiation. The 6-6 cell.
46	Steady-state teacher talk. The 1-9 diagonal (that is, 1-1 plus 2-2 plus 3-3, etc.).
47	Steady-state student talk. The 11-19 diagonal.
48	Teacher talk. The sum of columns 1-9.
49	Student talk. The sum of columns 11-19.
50	Drill. The sum of the 4-15 cell plus the 15-4 cell.
51	Average length of teacher initiation. The column 6 total divided by the column 6 total minus the 6-6 cell (calculated from the raw tally matrix).
52	Inquiry. The sum of the 3-3 cell plus the 4-4 cell plus the 15-15 cell plus the 16-16 cell.
53	Inquiry-drill, percent. Inquiry divided by inquiry plus drill.
54	Pupil initiation following teacher indirect. The sum of rows 1-3 for columns 11-19.

Appendix C

Table 163

Correlation of Global Ratings with Pupil Data for Nonentering First Grades

Ratings	Group			Individual			Days
	Conc.[1]	Skill[1]	Abst.[1]	Conc.[2]	Skill[1]	Abst.[1]	Abs.[1]
Pupil Groupings	-.05	-.34*	.04	.29*	-.48**	.12	.12
Pupil Differentiation	-.53**	-.35**	-.08	-.28	-.12	-.49**	-.22
Teacher Voice Inflection	-.16	.24	.03	-.22	.35**	.04	-.15
Reinfor. from Pupils	-.29*	-.26	-.23	-.06	-.33**	-.22	-.26
Reinfor. from Adults	-.21	.10	.00	-.16	.15	.08	-.12
Reinfor. from Materials	-.30*	-.06	.02	-.13	-.02	.14	-.10
Pupil Self Control	.00	.17	.11	-.09	.32*	.06	-.26
Pupil Freedom	-.06	-.23	-.06	.21	-.40**	-.08	-.10
Cognitive Focus	.02	.35**	.11	-.12	.46**	.17	-.36**
Game-like Activities	-.25	-.29*	.07	-.09	-.23	-.10	-.08
Positive-Negative Climate	-.25	-.08	.03	-.14	-.01	-.13	-.25
Pupils Happy, Satisfied	-.34*	-.12	-.08	-.27	-.04	-.13	-.23
Classroom Attitude	-.28*	-.25	-.14	-.02	-.13	-.05	-.09
School Attitude	-.24	-.11	-.06	-.10	.00	-.06	-.03
Attention to Observers	.06	-.13	.25	.14	.11	.10	.11
Art Work	-.09	-.36**	-.21	.06	-.43**	-.10	.13
Room Displays	.25	.00	.00	.38**	-.23	.37**	.45**

[1]N = 50 classrooms. [2]N = 47 classrooms. *p < .05; **p < .01.

Table 164

Correlation of Classroom Description Data with Pupil Data for Nonentering First Grades

Classroom Description	Group			Individual			Days Abs.[1]
	Conc.[1]	Skill[1]	Abst.[1]	Conc.[2]	Skill[1]	Abst.[1]	
Teacher ethnic group	-.26	.00	.15	-.38**	.21	-.21	-.14
Classroom physical arrangement (formal = high)	.12	.12	.15	.15	.15	.23	-.07
Number of reading centers	.03	-.30*	-.15	.30*	-.40**	-.18	-.09
Number of interest centers	-.08	-.32*	-.21	.17	-.59**	-.31*	.07
Community size	.35**	.04	-.12	.45**	-.31*	.35**	.41**
Total school hours	-.12	.10	-.29*	-.33*	.23	-.21	-.26
Hours at meals, snacks	-.19	-.14	-.13	-.11	-.05	-.17	-.09
Hours of structured learning with teacher	.17	.42**	.22	-.07	.50**	.35**	.10
Hours of structured learning without teacher	-.02	-.15	-.14	-.03	-.18	-.20	-.25
Hours of unstructured time	-.11	-.31*	-.29*	.18	-.30*	-.26	.02
Physical size of classroom	-.27*	.00	-.04	-.21	.02	.10	.09
Carpet and soundproofing	-.31*	-.17	.03	-.18	-.15	-.04	.21
Pupil previous school experience	.35**	.24	-.01	.23	-.21	.30	.19
Pupil/teacher ratio	.00	-.03	-.05	-.06	.02	-.01	-.03
Percent time structured with teacher	.21	.43**	.30*	-.03	.46**	.39**	.14
Percent time structured without teacher	.00	-.16	-.11	.01	-.20	-.16	-.20
Percent time unstructured	-.11	-.31*	-.28*	.19	-.30*	-.25	.02
Space per child	-.36**	-.05	-.05	-.29*	.04	-.25	-.17
Percent nonwhite pupils	.17	.06	-.02	.19	-.03	.11	.18
Percent nonwhite adults	.33*	.15	.02	.40**	.01	.39**	.21

[1]N = 50 classrooms. [2]N = 47 classrooms. *$p < .05$; **$p < .01$.

Table 165

Mean T-Scores for Classroom Description Data

Classroom Description	Grade Level			
	K	E-1	C-1	2
Teacher ethnic group*	50.6	48.3	48.5	50.6
Classroom physical arrangement (formal = high)	48.3	51.5	51.9	53.4
Number of reading centers	50.3	47.5	50.9	50.8
Number of interest centers	53.3	47.4	49.0	47.3
Community size	53.0	40.3	52.8	50.5
Total school hours	40.3	60.1	50.1	52.3
Hours at meals, snacks	48.5	50.6	50.8	47.5
Hours of structured learning with teacher	43.2	54.4	51.2	52.6
Hours of structured learning without teacher	43.9	54.0	51.0	53.7
Hours of unstructured time	49.1	52.1	48.6	50.1
Physical size of classroom	53.4	47.9	48.0	48.5
Carpet and soundproofing	51.6	49.1	48.8	49.0
Pupil previous school experience	43.8	47.5	51.7	61.1
Pupil/teacher ratio	47.7	52.4	50.0	49.7
Percent time structured with teacher	48.6	50.1	50.2	49.6
Percent time structured without teacher	45.8	51.5	50.8	52.9
Percent time unstructured	52.8	49.4	47.8	48.9
Space per child	54.7	45.6	48.1	49.6
Percent nonwhite pupils	50.3	47.6	51.5	47.4
Percent nonwhite adults	49.6	49.1	51.7	47.9

* Nonwhite = 0; white = 1

Table 166

Correlation of Classroom Description Data with the Florida Climate and Control System[1]

Classroom Description	Factors								
	1	2	3	4	5	6	7	8	9
Teacher ethnic group[2]	-.04	.21**	.06	-.03	.06	-.02	.04	-.01	.20**
Classroom physical arrangement (formal = high)	.02	-.35**	-.23**	-.05	-.09	-.11	-.13*	-.10	-.29**
Number of reading centers	-.11	.29**	.01	-.32**	-.02	.10	-.03	.05	.27**
Number of interest centers	.02	.57**	.21**	-.14*	.07	.11	.21**	-.02	.37**
Community size	.14*	.10	-.07	-.10	-.05	-.14*	.14*	-.07	-.01
Total school hours	.00	-.27**	-.01	-.06	.03	.12*	-.09	.02	-.12*
Hours at meals, snacks	.13*	-.06	.02	.06	-.11	.05	.11	.07	-.07
Hours of structured learning with teacher	-.06	-.57**	-.25**	-.01	.00	-.16**	-.33**	-.01	-.21**
Hours of structured learning without teacher	.12*	.10	.24**	-.04	.07	.37**	.13*	.00	-.05
Hours of unstructured time	-.08	.36**	.16**	.00	-.03	.10	.14*	.00	.21**
Physical size of classroom	-.01	.23**	.05	.07	.08	-.05	.12*	-.06	.18**
Carpet and soundproofing	-.09	.18**	.15**	.23**	.08	-.01	.00	.00	.20**
Pupil previous school experience	.13*	-.12*	-.05	-.02	-.09	.01	-.01	-.04	-.13*
Pupil/teacher ratio	-.04	-.10	-.10	-.09	-.01	.10	-.10	-.22**	-.11
Percent time structured with teacher	-.10	-.51**	-.29**	-.01	-.01	-.30**	-.34**	-.01	-.16**
Percent time structured without teacher	.13*	.17**	.28**	-.02	.07	.35**	.17**	.00	-.02
Percent time unstructured	-.10	.44**	.15**	.00	-.03	.04	.15**	-.02	.26**
Space per child	-.02	.25**	.06	-.02	-.03	-.07	.10	-.02	.21**
Percent nonwhite pupils	.15**	-.30**	-.14*	.06	-.05	-.09	.08	-.05	-.25**
Percent nonwhite adults	.08	-.24**	-.09	.07	-.03	-.03	.01	.02	-.21**

[1] N = 289 classrooms

*p < .05

**p < .01

[2] Nonwhite = 0; white = 1

Table 167

Correlation of Classroom Description Data with the Teacher Practices Observation Record[1]

Classroom Description	Factors						
	1	2	3	4	5	6	7
Teacher ethnic group[2]	-.21**	.02	-.12*	-.04	.22**	-.03	.18**
Classroom physical arrangement (formal = high)	.17**	-.15**	-.02	.20**	-.24**	.01	-.21**
Number of reading centers	-.31**	.16**	-.11	-.05	.27**	.09	.34**
Number of interest centers	-.43**	.37**	-.21**	.03	.50**	.07	.54**
Community size	-.13*	-.02	-.14*	.18**	.08	-.03	.02
Total school hours	.27**	.06	.06	-.10	-.28**	.08	-.14*
Hours at meals, snacks	.08	.04	.01	-.14*	-.01	.05	-.03
Hours of structured learning with teacher	.44**	-.29**	.17**	.09	-.57**	-.07	-.47**
Hours of structured learning without teacher	.05	.34**	.05	-.03	.11	.17**	.22**
Hours of unstructured time	-.31**	.25**	-.18**	-.23**	.37**	-.01	.33**
Physical size of classroom	-.14*	.11	-.08	-.01	.17**	-.03	.11
Carpet and soundproofing	-.06	.03	-.02	-.19**	.17**	-.11	.10
Pupil previous school experience	.09	.08	.08	.01	-.12*	-.12*	-.05
Pupil/teacher ratio	.01	-.09	.01	.27**	-.06	.05	.00
Percent time structured with teacher	.35**	-.40**	.16**	.19**	-.53**	-.12*	-.49**
Percent time structured without teacher	.00	.34**	.03	-.01	.18**	.17**	.27**
Percent time unstructured	-.40**	.21**	-.20**	-.20**	.45**	-.04	.36**
Space per child	-.23**	.09	-.08	-.02	.24**	-.07	.14*
Percent nonwhite pupils	.25**	-.18**	.11	.02	-.31**	-.03	-.34**
Percent nonwhite adults	.25**	-.09	.12*	-.01	-.26**	.02	-.26**

[1] N = 289 classrooms

*p < .05 **p < .01

[2] Nonwhite = 0; white = 1

Table 168

Correlation of Classroom Description Data with the Reciprocal Category System[1]

Classroom Description	Factors 1	2	3	4	5	6	7	8	9
Teacher ethnic group[2]	.24**	.20**	-.18**	-.07	-.04	.17**	-.03	.21**	-.04
Classroom physical arrangement (formal = high)	-.23**	-.13*	.07	.20**	-.10	.08	-.05	-.08	-.11
Number of reading centers	.20**	.07	-.21**	-.12*	.09	.09	.01	.05	-.11
Number of interest centers	.41**	.26**	-.27**	-.15**	.16**	.00	-.06	.16**	-.04
Community size	.11	.06	-.14*	.07	.16**	-.10	-.13*	-.02	-.07
Total school hours	-.22**	-.18**	.29**	.08	-.19**	.14*	.02	-.12*	.10
Hours at meals, snacks	.02	.06	.15**	.02	-.10	.07	-.08	.00	.07
Hours of structured learning with teacher	-.37**	-.24**	.42**	.23**	-.04	.01	-.01	-.20**	.13*
Hours of structured learning without teacher	.05	-.11	-.09	-.17**	-.06	.17**	.09	.05	-.07
Hours of unstructured time	.22**	.20**	-.16**	-.08	-.15**	.05	.01	.08	-.02
Physical size of classroom	.12*	.12*	-.13*	.01	.01	-.03	.01	.09	.02
Carpet and soundproofing	.19**	.14*	.10	-.09	-.10	.04	.04	.12*	.14*
Pupil previous school experience	.00	.01	-.02	.06	.00	.11	-.06	-.03	-.07
Pupil/teacher ratio	-.14*	-.08	-.04	.05	.05	.08	.04	.06	-.11
Percent time structured with teacher	-.31**	-.18**	.33**	.23**	.08	-.09	-.03	-.18**	.12*
Percent time structured without teacher	.10	-.08	-.15**	-.20**	-.03	.14*	.08	.08	-.09
Percent time unstructured	.28**	.24**	-.24**	-.09	-.10	.00	.02	.11	-.06
Space per child	.20**	.08	-.21**	-.11	.06	.01	.02	.04	-.05
Percent nonwhite pupils	-.21**	-.21**	.23**	.12*	.08	-.16**	-.13*	-.17**	.10
Percent nonwhite adults	-.25**	-.19**	.24**	.12*	.02	-.17**	-.04	-.16**	.10

[1] N = 289 classrooms

[2] Nonwhite = 0; white = 1

*$p < .05$ **$p < .01$

Table 169

Correlation of Classroom Description Data with the Taxonomy of Cognitive Behavior[1]

Classroom Description	Factors							
	1	2	3	4	5	6	7	8
Teacher ethnic group[2]	-.08	.02	-.05	.04	-.12*	.08	-.10	.14*
Classroom physical arrangement (formal = high)	.08	.06	.28**	-.05	.03	-.02	-.06	-.02
Number of reading centers	-.18**	-.02	-.10	.01	-.05	.05	-.04	.10
Number of interest centers	-.32**	-.02	-.35**	.06	-.04	.12*	.01	.12*
Community size	-.02	-.07	-.21**	-.03	.00	.03	-.06	.02
Total school hours	.01	.17**	.42**	.00	.16**	-.14*	-.06	.01
Hours at meals, snacks	.04	.01	.09	.07	.08	-.08	-.11	.04
Hours of structured learning with teacher	.26**	.11	.37**	-.07	.23**	-.02	-.01	-.12*
Hours of structured learning without teacher	-.16**	.10	.16**	.01	-.09	-.10	.04	.07
Hours of unstructured time	-.21**	.05	-.08	.11	-.02	-.05	-.10	.13*
Physical size of classroom	-.03	.03	-.12*	-.05	.03	.11	.04	.01
Carpet and soundproofing	.08	.00	-.05	.12*	.12*	.12*	-.04	.10
Pupil previous school experience	-.02	.08	.12*	-.09	.04	-.07	-.08	.07
Pupil/teacher ratio	.09	-.06	.06	-.08	-.12*	.03	-.01	-.03
Percent time structured with teacher	.31**	.01	.18**	-.09	.19**	.06	.02	-.15**
Percent time structured without teacher	-.18**	.05	.06	.00	-.14*	-.08	.07	.07
Percent time unstructured	-.21**	.01	-.23**	.13*	-.06	.01	-.09	.13*
Space per child	.00	-.04	-.24**	.00	.00	.12*	.07	.10
Percent nonwhite pupils	.19**	-.01	.05	.02	.18**	-.01	.02	-.06
Percent nonwhite adults	.15**	-.05	.07	-.03	.19**	-.03	.05	-.14*

[1] N = 289 classrooms

*p < .05 **P < .01

[2] Nonwhite = 0; white = 1

Appendix D

Table 170

Florida Climate and Control System
Means and Standard Deviations for Kindergarten
by Small and Large City

Factors	Small City[1]		Large City[2]	
	X	S	X	S
1. Strong Control	47.13	5.44	51.52	7.33
2. Pupil Free Choice vs No Choice	53.66	6.16	51.88	4.10
3. Teacher-Pupil Supportive Behavior	49.77	4.82	50.93	5.96
4. Nonverbal Gentle Control	50.95	5.52	50.91	6.35
5. Gentle Control	51.52	5.57	50.29	5.30
6. Work Without Teacher	44.36	4.20	47.28	5.77
7. Pupil Negative Affect	49.16	6.65	52.35	6.58
8. Teacher Attention in a Task Setting	50.81	4.66	49.18	6.77
9. Teacher Positive Affect	54.79	5.29	50.13	6.24

[1]N = 14 classrooms [2]N = 40 classrooms

Table 171

Florida Climate and Control System
Correlations with Pupil Data for Kindergarten by Small and Large City

Factors	Small City			Days	Large City			Days
	Conc.[3]	Skill[1]	Abst.[1]	Abs.[1]	Conc.[4]	Skill[2]	Abst.[2]	Abs.[2]
1. Strong Control	-.20	-.47	-.25	.27	-.13	-.08	-.11	.13
2. Pupil Free Choice vs No Choice	.34	-.62*	-.67**	-.29	-.06	-.10	-.18	.10
3. Teacher-Pupil Supportive Behavior	-.46	-.54*	-.54*	.70**	-.03	.00	-.09	.11
4. Nonverbal Gentle Control	-.07	.55*	.56*	.12	-.25	-.11	-.21	.01
5. Gentle Control	.19	-.08	-.42	-.11	-.18	.09	.08	.04
6. Work Without Teacher	-.08	-.13	.01	-.34	-.31	-.14	-.26	-.24
7. Pupil Negative Affect	-.49	-.57*	-.58*	.24	-.11	-.10	-.14	.06
8. Teacher Attention in a Task Setting	.04	-.15	-.17	-.29	-.04	.50**	.20	-.19
9. Teacher Positive Affect	.35	-.38	-.54	-.34	-.02	.26	.06	-.10

[1]N = 14 classrooms [3]N = 12 classrooms *$p < .05$

[2]N = 40 classrooms [4]N = 37 classrooms **$p < .01$

Table 172

Florida Climate and Control System
Means and Standard Deviations for Nonentering First Grades by
Small and Large City

Factors	Small City[1]		Large City[2]	
	$\bar{X}$	S	$\bar{X}$	S
1. Strong Control	48.87	5.35	51.26	5.04
2. Pupil Free Choice vs No Choice	48.30	7.79	49.10	5.21
3. Teacher-Pupil Supportive Behavior	47.17	6.91	49.63	5.39
4. Nonverbal Gentle Control	54.20	8.63	47.73	5.32
5. Gentle Control	50.06	6.85	47.47	5.58
6. Work Without Teacher	54.00	6.64	50.29	6.74
7. Pupil Negative Affect	46.29	4.32	50.08	5.47
8. Teacher Attention in a Task Setting	52.38	5.76	49.26	5.15
9. Teacher Positive Affect	52.99	6.71	47.44	6.14

[1]N = 16 classrooms

[2]N = 34 classrooms

Table 173

Florida Climate and Control System
Correlations with Pupil Data for Nonentering First Grades by Small and Large City

Factor	Group			Individual			Days
	Conc.	Skill	Abst.	Conc.	Skill	Abst.	Abs.
Small City[1]							
1. Strong Control	-.36	.08	-.26	-.58*	.31**	-.48	-.05
2. Pupil Free Choice vs No Choice	.41	-.23	.03	.05	-.75**	-.11	-.47*
3. Teacher-Pupil Supportive Behavior	-.15	.13	.07	-.46	-.02	-.63**	-.54*
4. Nonverbal Gentle Control	-.44	.15	.01	-.37	.28	-.14	.24
5. Gentle Control	.17	.29	.54*	.14	.04	.15	.13
6. Work Without Teacher	-.53*	.30	.00	-.68**	.45	-.54*	-.45
7. Pupil Negative Affect	-.07	-.27	-.30	-.29	-.35	-.53*	-.27
8. Teacher Attention in a Task Setting	.26	-.04	-.49	-.37	-.35	-.14	-.25
9. Teacher Positive Affect	-.07	.44	.22	-.45	-.06	-.29	-.59*
Large City[2]							
1. Strong Control	.12	.20	-.06	-.08	.05	.04	.32
2. Pupil Free Choice vs No Choice	-.27	-.38*	-.24	-.08	-.42*	-.22	.10
3. Teacher-Pupil Supportive Behavior	-.35*	-.41*	-.40*	-.17	-.29	-.14	.31
4. Nonverbal Gentle Control	-.15	-.14	-.42*	.05	-.22	-.07	.12
5. Gentle Control	-.03	-.06	-.12	-.24	.08	.14	-.01
6. Work Without Teacher	-.38*	-.44**	.01	-.14	-.23	-.39*	.16
7. Pupil Negative Affect	-.21	-.24	-.19	-.24	-.38*	-.20	.25
8. Teacher Attention in a Task Setting	.22	.15	-.09	.18	-.14	.11	.21
9. Teacher Positive Affect	-.35*	-.47**	-.32	-.08	-.40*	-.29	.03

[1]N = 16 classrooms [2]N = 34 classrooms *p < .05 **p < .01

Table 174

Teacher Practices Observation Record
Means and Standard Deviations for Kindergarten
by Small and Large City

Factors	Small City[1] $\bar{X}$	Small City[1] S	Large City[2] $\bar{X}$	Large City[2] S
1. Convergent Teaching	44.29	7.07	49.82	5.31
2. Experimental Teaching	48.70	4.20	49.33	4.52
3. Teacher Discourages Exploration	45.86	2.77	49.45	4.24
4. Undifferentiated Teaching	48.69	4.61	49.88	7.01
5. Pupil Free Choice vs Teacher Structured Activity	56.40	5.85	50.82	5.38
6. Unnamed	50.82	6.53	50.30	4.13
7. Exploration of Ideas vs Textbook Learning	54.88	5.52	49.85	4.67

[1]N = 14 classrooms [2]N = 40 classrooms

Table 175

Teacher Practices Observation Record
Correlations with Pupil Data for Kindergarten by Small and Large City

Factors	Small City Conc.[3]	Small City Skill[1]	Small City Abst.[1]	Days Abs.[1]	Large City Conc.[4]	Large City Skill[2]	Large City Abst.[2]	Days Abs.[2]
1. Convergent Teaching	-.25	.67**	.74**	.10	-.22	.08	.00	-.09
2. Experimental Teaching	-.10	-.36	-.49	.14	.02	.09	-.08	-.15
3. Teacher Discourages Exploration	-.25	-.15	.07	.03	-.12	.14	-.01	-.08
4. Undifferentiated Teaching	-.34	-.01	-.25	.37	.03	-.11	-.07	.02
5. Pupil Free Choice vs Teacher Structured Activity	.11	-.71**	-.71**	.17	.05	-.16	-.20	.14
6. Unnamed	-.57	-.51	-.51	.40	-.02	.15	.02	.12
7. Exploration of Ideas vs Textbook Learning	.19	-.48	-.54*	.08	.03	-.11	-.19	-.10

[1]N = 14 classrooms [3]N = 12 classrooms *p < .05

[2]N = 40 classrooms [4]N = 37 classrooms **p < .01

Table 176

Teacher Practices Observation Record
Means and Standard Deviations for Nonentering First Grades by
Small and Large City

Factors	Small City[1]		Large City[2]	
	$\bar{X}$	S	$\bar{X}$	S
1. Convergent Teaching	50.15	8.98	50.77	7.27
2. Experimental Teaching	46.82	4.37	50.47	5.49
3. Teacher Discourages Exploration	51.35	7.70	50.00	4.56
4. Undifferentiated Teaching	45.15	6.76	51.26	7.49
5. Pupil Free Choice vs Teacher Structured Activity	47.01	6.27	49.99	5.62
6. Unnamed	48.47	3.67	50.63	5.02
7. Exploration of Ideas vs Textbook Learning	46.69	7.81	49.81	5.66

[1]N = 16 classrooms [2]N = 34 classrooms

Table 177

Teacher Practices Observation Record
Correlations with Pupil Data for Nonentering First Grades by Small and Large City

Factor	Group			Individual			Days
	Conc.	Skill	Abst.	Conc.	Skill	Abst.	Abs.
Small City[1]							
1. Convergent Teaching	-.35	.17	.37	.23	.68**	.40	.52*
2. Experimental Teaching	.19	.14	.15	-.32	-.16	-.46	-.61*
3. Teacher Discourages Exploration	-.34	.18	-.21	-.51	.34	-.53*	-.25
4. Undifferentiated Teaching	.23	-.02	.18	.41	-.11	-.10	.09
5. Pupil Free Choice vs Teacher Structured Activity	.35	-.31	.04	.15	-.70**	-.18	-.48
6. Unnamed	.60*	.17	.03	-.06	-.21	-.17	-.10
7. Exploration of Ideas vs Textbook Learning	.42	-.30	.03	.23	-.73**	-.13	-.41.
Large City[2]							
1. Convergent Teaching	.21	.40*	.27	-.10	.39*	.46**	-.02
2. Experimental Teaching	-.40*	-.40*	-.41*	.05	-.42*	-.31	.17
3. Teacher Discourages Exploration	.01	.07	-.02	-.37*	-.03	.12	.09
4. Undifferentiated Teaching	.27	.23	-.25	-.10	.25	.43*	-.14
5. Pupil Free Choice vs Teacher Structured Activity	-.34*	-.46**	-.35*	-.02	-.46**	-.37*	.18
6. Unnamed	.02	.04	-.03	-.02	.03	.10	.15
7. Exploration of Ideas vs Textbook Learning	-.48**	-.52**	-.33	-.03	-.43*	-.40*	-.07

[1]N = 16 classrooms [2]N = 34 classrooms *p < .05 **p < .01

Table 178

Reciprocal Category System
Means and Standard Deviations for Kindergarten
by Small and Large City

Factors	Small City[1] $\bar{X}$	Small City[1] S	Large City[2] $\bar{X}$	Large City[2] S
1. Varied Pupil Initiated Interaction vs Response to Teacher	53.50	4.90	52.92	5.24
2. Teacher Response and Amplification	51.22	7.69	51.18	5.20
3. Drill	45.46	8.13	48.77	6.08
4. Teacher Direction and Criticism vs Teacher Indirect	46.86	7.97	49.88	5.51
5. Extended Teacher Talk	52.77	6.90	50.23	6.74
6. Pupil Talk	48.12	8.01	49.60	8.95
7. Teacher Acceptance vs Teacher Correction	53.69	8.08	48.39	7.42
8. Supportive Pupil Talk	52.55	6.22	50.42	4.28
9. Teacher-Pupil Interaction in Accepting Climate	49.19	7.82	49.52	6.22

[1]N = 14 classrooms [2]N = 40 classrooms

Table 179

Reciprocal Category System
Correlations with Pupil Data for Kindergarten by Small and Large City

Factors	Small City Conc.[3]	Small City Skill[1]	Small City Abst.[1]	Small City Days Abs.[1]	Large City Conc.[4]	Large City Skill[2]	Large City Abst.[2]	Large City Days Abs.[2]
1. Varied Pupil Initiated Interaction vs Response to Teacher	-.09	-.49	-.44	.31	.21	.13	-.07	.33*
2. Teacher Response and Amplification	-.18	-.22	-.15	.26	.22	.24	-.01	.16
3. Drill	-.15	.54*	.51	-.15	.02	.30	.23	-.12
4. Teacher Direction and Criticism vs Teacher Indirect	-.33	.23	.06	.10	-.01	-.05	-.17	-.19
5. Extended Teacher Talk	.17	.10	.27	-.01	-.15	-.20	-.22	.05
6. Pupil Talk	.16	-.21	.22	.01	.25	.14	.27	.52**
7. Teacher Acceptance vs Teacher Correction	.19	.08	.32	-.44	.07	.24	.15	-.02
8. Supportive Pupil Talk	.21	-.25	.01	.07	-.21	-.05	-.07	.18
9. Teacher-Pupil Interaction in Accepting Climate	-.16	.09	-.08	.38	.03	.05	.05	-.09

[1]N = 14 classrooms [3]N = 12 classrooms *p < .05
[2]N = 40 classrooms [4]N = 37 classrooms **p < .01

Table 180

Reciprocal Categories System
Means and Standard Deviations for Nonentering First Grades by
Small and Large City

Factors	Small City[1]		Large City[2]	
	$\bar{X}$	S	$\bar{X}$	S
1. Varied Pupil Initiated Interaction vs Response to Teacher	46.43	5.03	49.42	5.40
2. Teacher Response and Amplification	47.20	6.39	48.90	6.14
3. Drill	54.18	9.60	50.59	5.21
4. Teacher Direction and Criticism vs Teacher Indirect	51.54	5.33	50.75	7.09
5. Extended Teacher Talk	46.94	5.16	50.79	6.08
6. Pupil Talk	48.05	7.10	49.94	7.36
7. Teacher Acceptance vs Teacher Correction	50.43	6.02	47.98	6.97
8. Supportive Pupil Talk	48.19	4.50	51.09	4.96
9. Teacher-Pupil Interaction in Accepting Climate	48.93	5.94	50.73	6.18

[1]N = 16 classrooms [2]N = 34 classrooms

Table 181

Reciprocal Categories System
Correlations with Pupil Data for Nonentering First Grades by Small and Large City

Factor	Group			Individual			Days
	Conc.	Skill	Abst.	Conc.	Skill	Abst.	Abs.
Small City[1]							
1. Varied Pupil Initiated Interaction vs Response to Teacher	.20	-.30	-.20	-.04	-.61*	-.31	-.40
2. Teacher Response and Amplification	.10	-.05	-.05	-.29	-.44	-.40	-.25
3. Drill	-.40	.49	.38	-.30	.88**	.27	.26
4. Teacher Direction and Criticism vs Teacher Indirect	-.22	.15	-.18	-.01	.43	.16	.33
5. Extended Teacher Talk	.47	-.01	-.28	.14	-.57*	-.32	.14
6. Pupil Talk	.02	.09	-.37	.14	.09	-.17	-.13
7. Teacher Acceptance vs Teacher Correction	-.13	.11	.49	-.01	.13	.29	-.12
8. Supportive Pupil Talk	.12	-.14	-.15	.12	-.36	-.32	.07
9. Teacher-Pupil Interaction in Accepting Climate	-.20	.41	.33	-.07	.53*	.62**	.06
Large City[2]							
1. Varied Pupil Initiated Interaction vs Response to Teacher	-.08	-.13	-.11	-.03	-.22	-.17	.03
2. Teacher Response and Amplification	.00	.20	.03	-.13	.09	.10	-.05
3. Drill	.19	.23	.34*	.03	.15	.23	.13
4. Teacher Direction and Criticism vs Teacher Indirect	.25	.42*	-.08	.15	.30	.15	-.01
5. Extended Teacher Talk	-.07	-.28	-.36*	-.15	-.22	-.02	.02
6. Pupil Talk	.15	.03	.27	.10	.12	-.04	-.02
7. Teacher Acceptance vs Teacher Correction	-.24	-.31	.15	-.28	-.25	-.06	.06
8. Supportive Pupil Talk	-.02	.01	.12	-.03	-.11	.09	-.02
9. Teacher-Pupil Interaction in Accepting Climate	-.08	.04	.17	-.07	-.13	.03	-.05

[1]N = 16 classrooms [2]N = 34 classrooms *$p < .05$ **$p < .01$

Table 182

Taxonomy of Cognitive Behavior
Means and Standard Deviations for Kindergarten by Small and Large City

Factors	Small City[1] $\bar{X}$	Small City[1] S	Large City[2] $\bar{X}$	Large City[2] S
1. Memory	48.00	7.47	51.03	6.66
2. Applying Previous Learning	47.61	4.77	49.77	7.33
3. Reading	42.97	4.17	46.81	6.49
4. Naming	49.13	6.06	51.37	6.70
5. Academic Skills	45.61	4.51	50.30	6.14
6. Unnamed	50.39	4.36	52.69	6.17
7. Classification	52.81	5.41	49.88	5.14
8. Information Giving and Receiving	49.29	4.31	49.40	4.75

[1]N = 14 classrooms [2]N = 40 classrooms

Table 183

Taxonomy of Cognitive Behavior
Correlations with Pupil Data for Kindergarten by Small and Large City

Factors	Small City Conc.[3]	Small City Skill[1]	Small City Abst.[1]	Small City Days Abs.[1]	Large City Conc.[4]	Large City Skill[2]	Large City Abst.[2]	Large City Days Abs.[2]
1. Memory	-.34	.43	.53*	.19	-.07	.02	.02	-.07
2. Applying Previous Learning	.45	.09	.15	-.36	.31	.27	.24	.03
3. Reading	-.10	.84**	.71**	-.26	.10	.42**	.33*	-.14
4. Naming	-.31	.47	.30	.12	.23	.10	-.09	-.16
5. Academic Skills	-.39	.24	.02	.06	.31	.27	.39*	.14
6. Unnamed	.12	-.19	.20	-.30	.24	.06	.19	.30
7. Classification	-.17	-.13	-.11	-.19	-.15	-.15	-.07	-.10
8. Information Giving and Receiving	-.72**	-.13	-.09	.64*	.18	.06	-.03	-.10

[1]N = 14 classrooms [3]N = 12 classrooms *p < .05

[2]N = 40 classrooms [4]N = 37 classrooms **p < .01

Table 184

Taxonomy of Cognitive Behavior
Means and Standard Deviations for Nonentering First Grades by
Small and Large City

Factors	Small City[1]		Large City[2]	
	$\bar{X}$	S	$\bar{X}$	S
1. Memory	58.50	9.19	49.02	5.74
2. Applying Previous Learning	49.28	8.01	49.57	6.56
3. Reading	54.29	2.45	49.88	6.41
4. Naming	50.87	6.76	49.43	7.22
5. Academic Skills	53.63	6.25	48.83	4.84
6. Unnamed	50.08	6.30	47.65	4.29
7. Classification	52.06	5.65	50.52	6.68
8. Information Giving and Receiving	50.33	5.17	49.87	5.40

[1]N = 16 classrooms [2]N = 34 classrooms

Table 185

Taxonomy of Cognitive Behavior
Correlations with Pupil Data for Nonentering First Grades by Small and Large City

Factor	Group			Individual			Days Abs.
	Conc.	Skill	Abst.	Conc.	Skill	Abst.	
Small City[1]							
1. Memory	-.55*	.32	-.03	-.51*	.78**	-.15*	.09*
2. Applying Previous Learning	.30	.08	.20	.57*	-.15	.54*	.51*
3. Reading	.08	.13	.15	.30	.10	.39	.28
4. Naming	-.03	.27*	.21	.00	.52*	-.03	-.23
5. Academic Skills	.13	.53*	.02	.10	.38	.09	.39
6. Unnamed	.39	.32	.24	.21	-.08	-.26	.24
7. Classification	-.14	-.06	.46	.14	.36	.04	.37
8. Information Giving and Receiving	.12	-.05	-.14	-.20	-.15	-.49	-.28
Large City[2]							
1. Memory	.36*	.17	.31	.24	.28	.10	-.30
2. Applying Previous Learning	-.30	-.18	.14	-.14	-.04	-.11	-.21
3. Reading	.31	.33	.41*	.12	.39*	.18	.06
4. Naming	-.24	-.43*	-.23	.09	-.39*	-.36*	.02
5. Academic Skills	-.35*	-.06	-.13	-.06	-.28	-.19	-.07
6. Unnamed	-.10	-.03	.18	.03	-.21	.07	-.07
7. Classification	.32	-.02	-.05	.21	.08	.22	.02
8. Information Giving and Receiving	-.12	-.42*	-.34*	.16	-.43*	-.26	.33

[1]N = 16 classrooms [2]N = 34 classrooms *p < .05 **p < .01

Appendix E

Sponsor Differences in Classroom Process

As indicated in the procedure section, differences in the classroom process measures from sponsor to sponsor were tested by the multiple range test, with the data from all grade levels included. Since the F ratio from the associated analysis of variance is sometimes not significant even though more than one nonsignificant range is indicated, primary reference will be made to the significance associated with the F.

Florida Climate and Control System

Factor 1 - Strong Control - As shown in Table 151, Gotkin, EDC, and PE were separated at one end of the distribution, and BE and Tucson were separated at the other end. The data suggest that the former group more often have strong control exercised in their classrooms than the latter group. It seems likely that other moderating influences also enter this analysis -- the effect of rural-urban and regional differences in the behaviors which are more commonly seen in classrooms, for example. The Tucson sample came largely from smaller cities or Southern cities, and the grade-level differences reported earlier suggest that there are behavioral differences associated with both region and rural-urban status. At the other end of the scale, Gotkin programs were entirely in large cities, Atlanta and New York City.

Factor 2 - Pupil Free Choice vs No Choice - The F ratio of 28.79 makes clear that this is a dimension along which sponsors differed greatly (Table 152). Four subgroups were created (counting single programs excluded from groups); one for the Nimnicht program in which Pupil free choice was greatest; another for EDC, Tucson, Bank Street and Gotkin; the third for Bushell, PE, and Comparison, and the Becker-Englemann program is set off to itself as giving pupils the least free choice. These differences appear to follow sponsors' descriptions of their programs. The Nimnicht program stresses self-directed learning for pupils with wide availability of auto-instructional devices and materials; the British Infant School emphasis conducted by EDC is well-known; Bank Street's emphasis on pupil self-direction is also well-known, but perhaps the independence of pupils in the Tucson and Gotkin programs would not be so clearly expected. At the other end of the scale, the programmed learning rationale of Becker-Englemann classrooms specifies structuring the child into learning activities which leave him little choice about what he does or how he does it.

Factor 3 - Teacher-Pupil Supportive Behavior - This factor established four subgroups in which significant differences did not exist (Table 153). Nimnicht, Bank Street, and EDC stood high on the factor, and BE, Comparison and PE classrooms stood low. This is an aspect of classroom interaction which would presumably be valued by all sponsors. The factor represents gentle control behavior as well as positive affect. It also represents support of one pupil by another, so that there are more opportunities for these items to be reflected in classrooms where there is more pupil-pupil interaction. Probably the pupil-pupil interaction is a part of the reason for the classrooms which

Table 186

Multiple Range Test - Florida Climate and Control System

Factor 1 - Strong Control

Sponsor	Mean	NSR*	S.D.	N
Gotkin	52.34		7.63	20
EDC	52.29		5.55	28
PE	51.56		6.80	33
Bushell	50.66		5.05	22
Bank St.	50.54		7.21	34
Nimnicht	50.49		6.17	37
Comp	49.07		5.97	55
BE	48.33		6.62	31
Tucson	47.62		5.33	29

F = 2.08 $p < .05$

*Non-significant range

Table 187

Multiple Range Test - Florida Climate and Control System

Factor 2 - Pupil Free Choice vs No Choice

Sponsor	Mean	NSR*	S.D.	N
Nimnicht	56.39		3.55	37
EDC	53.49		4.83	28
Tucson	53.39		3.73	29
Gotkin	52.46		4.23	20
Bank St.	51.23		5.08	34
Bushell	47.88		4.31	22
PE	47.84		4.41	33
Comp	47.24		5.55	55
BE	42.76		3.22	31

F = 28.79 $p < .01$

*Non-significant range

Table 188

Multiple Range Test - Florida Climate and Control System

Factor 3 - Teacher-Pupil Supportive Behavior

Sponsor	Mean	NSR*	S.D.	N
Nimnicht	52.87		5.46	37
Bank St.	51.83		5.06	34
EDC	51.22		5.50	28
Bushell	50.95		5.79	22
Gotkin	50.36		7.02	20
Tucson	50.27		6.33	29
PE	48.79		4.77	33
Comp	47.89		6.29	55
BE	46.31		6.57	31

F = 4.34 $p < .01$

*Non-significant range

Table 189

Multiple Range Test - Florida Climate and Control System

Factor 4 - Nonverbal Gentle Control

Sponsor	Mean	NSR*	S.D.	N
BE	54.61		7.08	31
Nimnicht	51.38		4.68	37
Bushell	50.58		6.73	22
EDC	50.05		5.60	28
Bank St.	49.55		6.55	34
Gotkin	49.55		8.20	20
PE	48.70		4.35	33
Comp	48.28		7.39	55
Tucson	47.83		7.18	29

F = 3.27 $p < .01$

*Non-significant range

stand high on the factor; and the low position for BE classrooms probably reflects both a low level of pupil-pupil interaction, as well as the fact that most teacher control is more firmly given than that which is reflected by the gentle control items in the factor. FLACCS 3 is correlated with TPOR 2, Experimental Teaching (.63), and FLACCS 2, Pupil Free Choice vs No Choice (.39). All three of these factors have Nimnicht representing the high end of the scale and Comparison classrooms and BE the low end.

Factor 4 - Nonverbal Gentle Control - One significant discrimination was made for this factor -- the Becker-Engelmann program stood higher than the others (Table 154). This is probably a function of at least two of the three items on the positive pole -- Teacher gestures and Level 2, Teacher Nonverbal Control. Teachers in the Becker-Engelmann program are trained to use gestures and hand signals in controlling the movement of pupils through the programmed learning materials.

Factor 5 - Gentle Control - Among the four subgroups within which no significant differences existed, Nimnicht, BE, Gotkin, and PE were set off at the high end of the factor, with Tucson, Bushell, EDC, and Comparison set off at the low end (Table 155). The high position for the Nimnicht program probably reflects again the intent that pupils should have considerable freedom to go from activity to activity. Some of the items in this factor overlap with those from the previous factor in which BE was also high -- items reflecting nods and smiles and bodily cues given by the teacher, as well as Level 2, Verbal Control (one degree firmer than the gentlest verbal control, so some of the same comments apply). The Bushell sample in this project is primarily a large city sample, and that may account for its position, but the position of the Tucson and EDC programs seem surprising.

Factor 6 - Work Without the Teacher - This factor created four subgroups without significant differences, and set off Tucson, Nimnicht, and Gotkin at the top end of the factor, and EDC, BE, Comparison, Bank Street, Bushell, and PE were set off at the bottom (Table 156). Perhaps the most surprising finding is that the EDC program was not one of those at the top end of the factor. The position of the Nimnicht program is expected; the emphasis of the Gotkin program on the development of materials in which pupils can take the teacher role appears to be reflected in their position; and the position of the Tucson program probably reflects the organization of the classroom into "committees", with one or another committee often working without adult supervision. The low position of the Bushell program probably reflects the fact that subgroups in each classroom generally have an adult available to them, although the pupil actually works alone much of the time.

Factor 7 - Pupil Negative Affect - For this factor, the Gotkin and Nimnicht programs were set off at the upper end of the factor, and Comparison and BE classrooms at the bottom end (Table 157). There appeared to be considerable parallel between the order of this factor, and Factors 1 and 2 reflecting teacher control and structuring. The Nimnicht program stood high on Work Without the Teacher and Pupil Free Choice, whereas the Gotkin program stood high on Strong Control. On the other hand, Comparison and Becker-Engelmann classrooms may stand low since more of the pupil's time is involved in activities or groups set by the teacher. Gotkin classrooms were only found in large city settings, which may also be an influence in the amount of negative affect expressed.

Table 190

Multiple Range Test - Florida Climate and Control System

Factor 5 - Gentle Control

Sponsor	Mean	NSR*	S.D.	N
Nimnicht	52.68		5.92	37
BE	51.96		6.21	31
Gotkin	51.89		4.16	20
PE	51.74		6.48	33
Bank St.	49.67		6.21	34
Comp	49.37		7.40	55
EDC	48.70		5.27	28
Bushell	46.42		6.24	22
Tucson	45.09		7.13	29

F = 4.95 $p < .01$

*Non-significant range

Table 191

Multiple Range Test - Florida Climate and Control System

Factor 6 - Work Without Teacher

Sponsor	Mean	NSR*	S.D.	N
Tucson	54.33		6.52	29
Nimnicht	53.03		7.62	37
Gotkin	51.70		5.30	20
EDC	50.24		6.34	28
BE	49.80		7.40	31
Comp	49.33		6.70	55
Bank St.	48.06		5.98	34
Bushell	47.58		3.99	22
PE	46.65		7.21	33

F = 4.60 $p < .01$

*Non-significant range

Table 192

Multiple Range Test - Florida Climate and Control System

Factor 7 - Pupil Negative Affect

Sponsor	Mean	NSR*	S.D.	N
Gotkin	53.71		7.57	20
Nimnicht	52.47		6.83	37
EDC	51.40		4.71	28
Tucson	51.13		5.75	29
Bushell	51.02		6.04	22
PE	50.22		5.33	33
Bank St.	50.01		5.92	34
Comp	48.57		5.90	55
BE	46.33		5.14	31

$F = 4.03$ $p < .01$

*Non-significant range

Table 193

Multiple Range Test - Florida Climate and Control System

Factor 8 - Teacher Attention in a Task Setting

Sponsor	Mean	NSR*	S.D.	N
Bushell	56.69		7.50	22
Nimnicht	52.36		5.59	37
Bank St.	49.94		5.38	34
BE	49.55		7.27	31
PE	48.82		4.56	33
EDC	48.76		5.92	28
Gotkin	48.53		6.57	20
Comp	48.21		5.75	55
Tucson	47.07		5.77	29

$F = 6.09$ $p < .01$

*Non-significant range

Factor 8 - Teacher Attention in a Task Setting - The Bushell and Nimnicht programs were set off at the high end of this factor (Table 158), and PE, EDC, Gotkin, Comparison, and Tucson were set off at the lower end. The position of the Bushell program probably reflects the typical organization cited earlier -- the teacher working with one pupil after another in a small group. The high standing for the Nimnicht program for teacher attention in a task setting is surprising, in the light of other factors reflecting pupil freedom. The position of the EDC program in the lower group may not be strange in the sense that the typical pupil in that program probably spends less of his day in direct contact with an adult than in most programs, and the high amount of work without the teacher was cited earlier for Gotkin and Tucson, but the reasons for the other programs in the lower subgroups are not clear.

Factor 9 - Teacher Positive Affect - The Nimnicht and Tucson programs were set off at the high end of the factor, the Bank Street, Bushell, Comparison, EDC, and PE programs are set off at the lower end (Table 159). While it seems probable that all sponsors would value teacher positive affect, it seems likely that they differ in the extent to which it is explicitly used. Pupils in the Nimnicht program alternate between periods of considerable freedom, as indicated earlier, and periods of work with an adult. Presumably the Teacher Positive Affect is expressed to a considerable degree in these teacher-pupil interactions. The Tucson programs also involves teacher-pupil interaction in small groups most of the day, with pupil self esteem as one of its goals. The factor tends to correlate with measures representing pupil freedom, so that apparently both positive and negative affect occur more often in freer settings.

Teacher Practices Observation Record

Factor 1 - Convergent Teaching - This factor sets numbers of programs apart from each other (Table 160). The high positions of the BE program appear to be expected on the basis of the contingency management-learning approach. The position of the EDC program along with the Nimnicht and Tucson programs at the lower end of the factor also seem to agree with program orientations which stress multiple individual directions of activity by pupils.

Factor 2 - Experimental Teaching - In some ways this factor is the converse of Factor 1, and the order of programs reflects this to a considerable degree with Nimnicht, Tucson, and EDC at the high end of the factor, and BE at the lower end of the factor (Table 161). The essence of the factor appears to be the pupil's involvement in a situation which is not entirely clear to him, with whose complexities he is expected to cope individually, but with the teacher dealing with inaccuracies and errors. Again, multiple individual activities were indicated. The factor appears to tap an important aspect of the three programs which are high, and it also seems clear that the factor is the opposite of the basis for the BE program -- advancement by small steps to minimize uncertainty or error.

Factor 3 - Teacher Discourages Exploration - The Bushell, BE, Comparison, and Nimnicht programs were set off at the upper end of the factor, and all other programs were set off at the lower end, but the Tucson program deviates somewhat

Table 194

Multiple Range Test - Florida Climate and Control System

Factor 9 - Teacher Positive Affect

Sponsor	Mean	NSR*	S.D.	N
Nimnicht	53.13		6.19	37
Tucson	52.21		5.44	29
Gotkin	50.66		6.61	20
BE	50.41		7.12	31
Bank St.	49.40		6.68	34
Bushell	48.47		5.16	22
Comp	48.28		7.51	55
EDC	47.71		6.48	28
PE	47.57		7.26	33

$F = 2.98$ $p < .01$

*Non-significant range

Table 195

Multiple Range Test - Teacher Practices Observation Record

Factor 1 - Convergent Teaching

Program	Mean	NSR*	S.D.	N
BE	59.12		6.76	31
Bushell	51.71		6.21	22
PE	51.62		6.25	33
Comp	51.16		7.05	55
Gotkin	50.79		5.70	20
Bank St.	50.66		5.97	34
EDC	47.91		5.87	28
Nimnicht	45.55		6.23	37
Tucson	43.66		4.85	29

$F = 15.55$ $p < .01$

*Non-significant range

Table 196

Multiple Range Test - Teacher Practices Observation Record

Factor 2 - Experimental Teaching

Program	Mean	NSR*	S.D.	N
Nimnicht	54.48		6.31	37
Tucson	53.70		5.77	29
EDC	51.21		5.52	28
Bank St.	50.78		3.74	34
PE	49.92		5.41	33
Bushell	48.59		4.69	22
Gotkin	48.29		3.71	20
Comp	48.06		5.13	55
BE	45.05		4.31	31

$F = 10.91$ $p < .01$

*Non-significant range

more widely from others at the low end of the factor (Table 162). The programmed learning approach of the two contingency management programs is apparently represented at the upper end of the factor, and there is evidence of restriction of activity of pupils in Comparison classrooms as well. The fact that the Nimnicht program was set off next below these is surprising in a sense, but it is almost exactly at the mean for all classrooms, so that this is perhaps not a meaningful separation. The separation of the Tucson program at the lower end of the factor is doubly interesting in the sense that a considerable proportion of their classrooms were Southern or rural. The data from entering first grade cited earlier suggested that classrooms in these regions tended to be relatively highly structured, so that the deviation of the Tucson program seems increasingly meaningful.

Factor 4 - Undifferentiated Teaching - Three programs, Comparison, PE, and Bank Street were set off at the upper end of this factor, with BE and Bushell at the lower end (Table 163). It seems likely that this position for the PE and Bank Street programs was not a reflection of intention of the program rationale. The high position of Comparison classrooms probably reflected, to some degree, the classroom with a single adult in it, in contrast to classrooms with two or three, as is usually true of program classrooms. The separation of the BE and Bushell at the bottom end of the scale, implying greater differentiation, appeared to be evidence that the advantage of greater differentiation which is claimed for programmed learning was occurring.

Factor 5 - Pupil Free Choice vs Teacher Structured Activity - The data from this factor parallel those from FLACCS Factor 2, Pupil Free Choice -- the same three programs, Nimnicht, Tucson, and EDC were set off at the upper end of both factors, and BE was set off at the lower end of both factors (Table 164). Although programs sometimes changed position as much as two ranks, the parallel in ranking throughout the range of the factor was relatively strong. As was noted in the section on process measures, the two factors correlated in the upper .70's, so the similarity of order is not surprising. The other common element across the two factors was that each of them created one of the higher F ratios and a greater number of discriminations between programs than most other factors.

A degree of agreement this high between instruments which have nothing in common in terms of theoretical base, used by different observers, is surprising. Probably this is true because differences in the freedom given pupils in contrast to teacher direction and structuring is a major dimension of differences along which programs scale.

Factor 6 - Unnamed - There were no discriminations between programs on this factor (Table 165).

Factor 7 - Exploration of Ideas vs Textbook Learning - The correlation between this factor (Table 166) and TPOR 5, Pupil Free Choice, is high enough to suggest that they might well have been pooled into one. The correlation between the two was +.87, despite the fact that only six items were common to the two factors and an additional 24 items were unique. Apparently when pupils explore ideas, it is typically in the context of considerable free

Table 197

Multiple Range Test - Teacher Practices Observation Record

Factor 3 - Teacher Discourages Exploration

Program	Mean	NSR*	S.D.	N
Bushell	54.40		6.31	22
BE	53.50		8.44	31
Comp	51.78		5.79	55
Nimnicht	50.15		6.45	37
EDC	49.87		4.65	28
Gotkin	49.56		5.85	20
PE	49.46		4.70	33
Bank St.	49.45		3.76	34
Tucson	46.58		4.06	29

$F = 4.80$ $p < .01$

*Non-significant range

Table 198

Multiple Range Test - Teacher Practices Observation Record

Factor 4 - Undifferentiated Teaching

Program	Mean	NSR*	S.D.	N
Comp	55.65		7.75	55
PE	54.75		10.19	33
Bank St.	53.59		7.56	34
EDC	49.88		5.49	28
Gotkin	48.32		6.94	20
Nimnicht	48.07		4.48	37
Tucson	47.11		5.35	29
BE	44.44		6.56	31
Bushell	41.93		4.40	22

$F = 15.04$ $p < .01$

*Non-significant range

Table 199

Multiple Range Test - Teacher Practices Observation Record

Factor 5 - Pupil Free Choice vs Teacher Structured Activity

Program	Mean	NSR*	S.D.	N
Nimnicht	56.08		4.11	37
Tucson	55.20		5.54	29
EDC	53.23		5.13	28
Bank St.	50.83		5.43	34
Gotkin	49.66		5.13	20
PE	47.79		5.06	33
Comp	47.04		5.42	55
Bushell	45.63		4.05	22
BE	42.12		2.40	31

F = 28.91 $p < .01$

*Non-significant range

Table 200

Multiple Range Test - Teacher Practices Observation Record

Factor 6 - Unnamed

Program	Mean	NSR*	S.D.	N
PE	51.44		4.46	33
Nimnicht	51.29		4.24	37
Gotkin	51.09		4.67	20
Comp	50.54		5.83	55
EDC	50.31		4.65	28
Bushell	49.99		6.72	22
Bank St.	49.96		4.66	34
Tucson	49.09		6.12	29
BE	48.56		5.33	31

F = 1.08

Table 201

Multiple Range Test - Teacher Practices Observation Record

Factor 7 - Exploration of Ideas vs Textbook Learning

Program	Mean	NSR*	S.D.	N
Tucson	56.15	|	3.97	29
Nimnicht	56.10	|	3.96	37
EDC	52.30	| |	4.50	28
Bank St.	51.68	| |	4.65	34
PE	49.74	| |	4.75	33
Gotkin	49.20	|	3.69	20
Comp	47.56	|	4.58	55
Bushell	42.45	|	2.85	22
BE	41.53	|	2.86	31

$F = 47.65$ $p < .01$

*Non-significant range

choice; and when teachers structure activities, the result is likely to be a rather carefully prescribed, preset series of activities. The F ratio for discriminations between programs was 47.65, the highest of any obtained; there were never more than two adjacent programs in the rank order which were not discriminated from each other. Again, the idea is underlined that the distinction between pupil freedom and diverse activity in contrast to teacher structuring and control is a central dimension along which programs differ.

Reciprocal Category System

Factor 1 - Varied Pupil Initiated Interaction vs Response to Teacher - This is another factor which related moderately highly to the pupil free choice factors in FLACCS and the TPOR, as well as the TPOR factor representing exploration of ideas (Table 167). The same programs were extreme, and there was considerable similarity in the order of programs. Nimnicht was set off at the high end of the factor, followed by Tucson, Bank Street, EDC, and Gotkin. BE was set off at the lower end of the factor. The F ratio was relatively high, and the same interpretations made for the FLACCS and TPOR factors just mentioned appear to apply here.

Factor 2 - Teacher Response and Amplification - There was some similarity in the order of programs to that for RCS 1, and the exploration of ideas and pupil freedom factors from the TPOR and FLACCS. The teacher, as this factor represents her, is neither directing pupils nor out of contact with them. Rather, she responds and amplifies, following the pupil's lead, but in all probability modifying the pupils behavior by what she chooses to respond to and amplify. Flanders' term "indirect influence" seems very appropriate to this factor.

The Nimnicht and EDC programs were separated from others at the upper end of this factor; the Gotkin, Comparison, and BE programs were separated at the lower end (Table 168). The data of the factor suggests that this responsive style of interacting with pupils is a common element of the EDC and Nimnicht programs, but it seems clear that a more directive role is characteristic of the BE program.

Factor 3 - Drill - The BE, Bushell, and PE programs were separated at the upper end of this factor; the Nimnicht, Bank Street, and Tucson programs were at the lower end (Table 169). It does not seem surprising that the BE and Bushell programs, both contingency management programs, would be high in drill-like activities. It does seem surprising, however, that the PE program is so placed. To the extent that it has a Piagetian orientation, this would argue against it, but, on the other hand it is not primarily a classroom-oriented program, but rather a home-base oriented program. The position of the Nimnicht, Bank Street, and Tucson programs seem consistent with their placements on other factors in the sense that freedom and exploration of ideas are more characteristic than a teacher question-pupil response style of interaction.

Factor 4 - Teacher Direction and Criticism vs Teacher Indirect - The PE and BE programs were separated at the high end of the factor, with the Tucson, Nimnicht, Gotkin, and Bank Street at the low end (Table 170). The factor reflected direction giving to a considerably greater degree than criticism.

Table 202

Multiple Range Test - Reciprocal Category System

Factor 1 - Varied Pupil Initiated Interaction vs Response to Teacher

Sponsor	Mean	NSR*	S.D.	N
Nimnicht	55.08		4.44	37
Tucson	52.83		4.85	29
Bank St.	52.62		5.71	34
EDC	52.35		4.85	28
Gotkin	51.08		5.25	20
PE	48.18		3.11	33
Bushell	48.16		4.29	22
Comp	47.90		4.94	55
BE	43.91		4.47	31

F = 17.85 $p < .01$

*Non-significant range

Table 203

Multiple Range Test - Reciprocal Category System

Factor 2 - Teacher Response and Amplification

Sponsor	Mean	NSR*	S.D.	N
Nimnicht	54.17		8.49	37
EDC	53.07		6.90	28
Bushell	51.22		6.30	22
Tucson	51.13		6.38	29
Bank St.	49.64		6.81	34
PE	49.46		6.04	33
Gotkin	49.18		5.83	20
Comp	48.41		7.79	55
BE	45.51		4.82	31

F = 4.69 $p < .01$

*Non-significant range

Table 204

Multiple Range Test - Reciprocal Category System

Factor 3 - Drill

Sponsor	Mean	NSR*	S.D.	N
BE	61.63		4.61	31
Bushell	51.98		6.71	22
PE	51.49		6.69	33
Gotkin	50.04		4.90	20
Comp	48.82		6.02	55
EDC	48.63		5.41	28
Tucson	47.47		4.90	29
Bank St.	47.12		5.14	34
Nimnicht	44.66		5.72	37

F = 23.52 $p < .01$

*Non-significant range

Table 205

Multiple Range Test - Reciprocal Category System

Factor 4 - Teacher Direction and Criticism vs Teacher Indirect

Sponsor	Mean	NSR*	S.D.	N
PE	53.34		5.73	33
BE	53.19		4.18	31
EDC	51.41		5.77	28
Comp	50.97		5.40	55
Bushell	50.96		6.53	22
Bank St.	48.91		6.52	34
Gotkin	48.26		6.60	20
Nimnicht	46.61		7.07	37
Tucson	46.18		6.14	29

F = 6.14 $p < .01$

*Non-significant range

The placement of the PE program at the high end of this factor is somewhat unexpected, but parallels the finding for the drill factor. The placement of the BE program seems reasonable, since direction giving to keep pupils together and move them along through the programmed materials is a frequent kind of teacher behavior. The placement of the four lower programs also appeared to parallel their positions on other factors.

Factor 5 - Extended Teacher Talk - Although significant discriminations were made by this factor, it was not one of the more discriminating factors (Table 171). Probably the best characterization of its discrimination is to identify the lower end, with BE, Bushell, and EDC falling in that order. Again, this seems in keeping with program orientation. Short interactions are characteristic of programmed learning activities, and extended teacher talk would also be out of character for a program such as EDC in which choice and varied pupil activity are seen as important.

Factor 6 - Pupil Talk - PE, Bushell, and BE were separated at the lower end of the factor, with Bank Street being set off at the upper end (Table 172). Large amounts of pupil talk seem consonant with the Bank Street concern for the development of a variety of objectives for children, and relatively smaller amounts of pupil talk, and particularly sustained pupil talk, seem appropriate to the two contingency management programs. The low level of pupil talk in Parent Education classrooms is surprising, but again, the primary orientation is not to classroom process.

Factor 7 - Teacher Acceptance vs Teacher Correction - The two high programs were BE and Tucson (Table 173). The pairing seems surprising, and it probably existed for different reasons. One of the central concerns of the Tucson program is building self-esteem in the pupils, and teacher acceptance and minimizing evaluation are seen as important toward this end. The BE program, on the other hand, stresses social reinforcement as a means of modifying behavior, and uses a curriculum which minimizes error on the part of the pupil so that a large proportion of his responses can be accepted and will not require correction. The position of the EDC program at the bottom of this factor is surprising. It may be that it is partly a function of the smaller amount of activity that occurs between the teacher and groups of pupils. The teacher in an EDC classroom, to a greater degree than teachers in other classrooms, moves through the classroom making brief contacts with individuals in small groups. It is difficult for an observer (or a tape recorder) to record, since it would be necessary virtually to tag along at the teacher's heels to collect continuing interaction. So this low position of the EDC program may to some degree represent difficulties in data collection.

The Parent Education and Bushell programs were set off at the bottom end of the factor, although to a lesser degree than the EDC program. There may also be data collection difficulties in the recording of the Bushell data since considerable portions of the interaction between adult and pupil take place as the adult leans close to the child talking with him about his work. This interaction is typically inaudible, so that significant fractions of the teacher-pupil interaction in the classroom can neither be heard by an observer nor recorded.

Table 206

Multiple Range Test - Reciprocal Category System

Factor 5 - Extended Teacher Talk

Sponsor	Mean	NSR*	S.D.	N
Tucson	51.86		6.33	29
Comp	51.12		7.89	55
Gotkin	51.11		6.69	20
Bank St.	50.73		6.16	34
PE	50.55		5.75	33
Nimnicht	50.09		5.53	37
EDC	49.19		6.69	28
Bushell	47.23		6.62	22
BE	45.99		4.69	31

F = 2.75 $p < .01$

*Non-significant range

Table 207

Multiple Range Test - Reciprocal Category System

Factor 6 - Pupil Talk

Sponsor	Mean	NSR*	S.D.	N
Bank St.	52.78		7.51	34
Nimnicht	51.56		9.43	37
Gotkin	51.34		8.99	20
Tucson	50.95		8.33	29
EDC	50.94		8.64	28
Comp	49.82		7.98	55
BE	47.40		6.89	31
Bushell	47.13		8.66	22
PE	46.02		6.06	33

F = 2.59 $p < .01$

*Non-significant range

Table 208

Multiple Range Test - Reciprocal Category System

Factor 7 - Teacher Acceptance vs Teacher Correction

Sponsor	Mean	NSR*	S.D.	N
Tucson	53.08		7.34	29
BE	52.86		5.72	31
Nimnicht	51.12		8.53	37
Gotkin	50.95		6.89	20
Comp	50.81		8.34	55
Bank St.	48.99		6.79	34
Bushell	47.75		5.55	22
PE	47.47		8.25	33
EDC	45.23		7.52	28

$F = 3.63$ $p < .01$

*Non-significant range

Table 209

Multiple Range Test - Reciprocal Category System

Factor 8 - Supportive Pupil Talk

Sponsor	Mean	NSR*	S.D.	N
Nimnicht	53.44		7.11	37
EDC	52.58		5.51	28
Gotkin	51.65		6.11	20
Tucson	50.71		4.80	29
PE	49.84		5.34	33
Bushell	49.66		5.18	22
Comp	49.62		5.66	55
Bank St.	49.61		4.65	34
BE	47.51		3.16	31

$F = 3.60$ $p < .01$

*Non-significant range

Factor 8 - Supportive Pupil Talk - The programs set off at the upper end of the factor were the Nimnicht and EDC programs, followed by Gotkin and Tucson (Table 174). The BE program was set off at the lower end of the factor. These groupings seem reasonable in that the amount of supportive pupil talk is to a considerable degree a reflection of the freedom pupils have to talk to each other. Numbers of the factors agree in depicting these four programs as high on measures in which pupils have considerable freedom, and that Becker-Engelmann classrooms are ones in which pupils have relatively little opportunity to interact with each other.

Factor 9 - Teacher-Pupil Interaction in an Accepting Climate - The contrast of this factor to the preceding one was an indicative one in the sense that contingency management programs were set off at the high end of this factor (Table 175). While the previous factor reflected the relatively small amounts of pupil-pupil interaction that occurred in those classrooms, this factor reflects the relatively large amounts of teacher-pupil interaction that occurred in those same classrooms. The finding that Bank Street classrooms were set off, along with Comparison classrooms, at the lower end of the factor was surprising, and seems not to agree with the program rationale.

Florida Taxonomy of Cognitive Behavior

Factor 1 - Memory - Two factors from this instrument involved aspects of cognitive level 1 behavior, Memory: this one which primarily represented repetitive activity, and another that primarily represented simple recall. Factor 1, which involved repetition, set off three programs at the upper end of the scale -- BE by a wide margin, then Comparison and Gotkin classrooms (Table 176). Probably there are some biases in these placements. Probably a greater fraction of the cognitive activity occurs in teacher-pupil interaction in the BE program than any other, and probably more of the classroom activity is audible and recordable. At the same time, there is little question that BE classrooms do more repetition of previous responses and choral responses than other classrooms. It is part of their program rationale, and is a prominant part of classroom process. Placement of the other two programs is reasonable. Probably more interaction in Comparison classrooms is audible than others, since only one pupil group is typically interacting with an adult and other pupils are expected to be relatively quiet; and Gotkin classrooms use material which makes cognitive activity audible by providing a problem and a focus for interaction.

Programs set off at the bottom of the factor included EDC, Bushell, and Nimnicht. Probably the audibility problems created by the typical style of much adult-child interaction in the Bushell classrooms cited previously create some bias in these cases, but it also seems probable that there are real differences of emphasis represented. A part of both EDC and Nimnicht rationales is the creation of conditions which foster individual self-directed learning.

Factor 2 - Applying Previous Learning - The F ratio for this factor was less than 1.0, indicating that the variability of behavior from classroom to classroom within programs was at least as great as the differences between programs (Table 177). However, the factor did show significant differences across the three time periods of the fall study, which suggests significant reliability.

Table 210

Multiple Range Test - Reciprocal Category System

Factor 9 - Teacher-Pupil Interaction in Accepting Climate

Sponsor	Mean	NSR*	S.D.	N
Bushell	55.68		6.68	22
BE	52.48		5.66	31
Gotkin	50.29		5.90	20
Tucson	50.04		7.92	29
PE	49.72		6.99	33
Nimnicht	49.52		6.22	37
EDC	48.89		5.59	28
Comp	48.03		6.17	55
Bank St.	47.72		7.28	34

$F = 3.91$ $p < .01$

*Non-significant range

Table 211

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 1 - Memory

Program	Mean	NSR*	S.D.	N
BE	63.34		5.74	31
Comp	51.77		5.68	55
Gotkin	50.16		5.79	20
Bank St.	48.87		6.88	34
PE	48.13		6.60	33
Tucson	47.07		4.73	29
EDC	46.29		5.73	28
Bushell	45.95		6.17	22
Nimnicht	45.59		5.40	37

$F = 27.31$ $p < .01$

*Non-significant range

Table 212

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 2 - Applying Previous Learning

Program	Mean	NSR*	S.D.	N
Gotkin	51.91		6.34	20
PE	51.51		7.42	33
Tucson	51.02		6.42	29
Bank St.	50.83		7.56	34
Bushell	49.51		5.43	22
EDC	49.48		5.14	28
Nimnicht	49.39		5.61	37
Comp	49.33		6.74	55
BE	48.79		9.17	31

$F = 0.80$

*Non-significant range

Factor 3 - Reading - Three programs were set off at the upper end of this factor -- the two contingency management programs, and Comparison classrooms (Table 178). This finding appears to agree with the emphases on development of academic skills associated with these programs.

Factor 4 - Naming - EDC and PE were set off at the high end of this factor, and Bank Street at the lower end (Table 179). The F is not significant, however, so that the differences may be chance.

Factor 5 - Academic Skills - This factor should perhaps have been titled "Academic Skills Other than Reading," and the results appear to parallel those for reading cited earlier (Table 180). The contingency management programs are set off at the high end of the factor, and Bank Street, Nimnicht, EDC, Comparison, and Tucson are set off at the lower end. Again, the parallel with emphasis on skills in the rationales of the programs seems clear. Comparison classrooms are not set off as part of the upper group, as they were with reading, but this seems reasonable. It seems likely that reading is more emphasized in nonprogram classrooms than other skills.

Factor 6 - Unnamed - The factor was not named because it did not have a central concept that could be identified, and it did not discriminate between programs (Table 181).

Factor 7 - Classification - The F ratio was not significant, so the groupings created may be chance ones, but the programs set off seem reasonable (Table 182). The PE program (which does not stress classroom process) has had some Piagetian emphasis, and classification is a related activity. The BE program works actively at concept development, using classification as one approach means. It does seem surprising, if the groupings are meaningful, that the Gotkin program was not toward the higher end of the factor, since classification is an important aspect of their materials.

Factor 8 - Information Giving and Receiving - The factor neither had a significant F ratio, nor were nonsignificant ranges identified (Table 183).

Global Ratings and Classroom Description

Factor 1 - Informal vs Formal Classroom Organization - This factor is related to the major element that was identified as running through both the TPOR and FLACCS -- the dimension of teacher control, direction, and structuring vs pupil freedom of choice, exploration and diversity of activities (Table 184). The Nimnicht program was set off at the upper end of the factor with Bushell and PE low, and BE and Comparison classrooms lower. The F of over 25 was one of the larger ones obtained, suggesting again the potency of the dimension. The groupings were highly parallel to those of FLACCS 2, Pupil Free Choice, as one example of the relation of this factor to others. The relevance of this order to program rationale has previously been discussed.

Factor 2 - Climate - BE was set off at the upper end of the factor and the Gotkin program at the lower end (Table 185). The use of positive affect by BE teachers as a way of controlling behavior and learning, and the fact that Gotkin programs were primarily entirely in large cities, have been cited earlier

Table 213

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 3 - Reading

Program	Mean	NSR*	S.D.	N
Bushell	57.69		7.62	22
BE	52.34		3.94	31
Comp	52.26		8.43	55
PE	49.64		6.39	33
Gotkin	49.11		5.56	20
Bank St.	48.79		5.48	34
EDC	48.57		5.09	28
Nimnicht	48.33		5.48	37
Tucson	46.24		4.93	29

$F = 7.62$ $p < .01$

*Non-significant range

Table 214

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 4 - Naming

Program	Mean	NSR*	S.D.	N
EDC	52.05		4.85	28
PE	51.35		7.93	33
BE	50.90		6.25	31
Tucson	50.44		7.74	29
Nimnicht	50.26		8.17	37
Bushell	49.70		9.12	22
Gotkin	49.56		6.69	20
Comp	48.24		7.38	55
Bank St.	47.08		8.39	34

$F = 1.48$

*Non-significant range

Table 215

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 5 - Academic Skills

Program	Mean	NSR*	S.D.	N
BE	54.67		6.14	31
Bushell	53.34		6.32	22
Gotkin	50.62		5.98	20
PE	50.40		5.45	33
Tucson	49.66		7.00	29
Comp	49.62		5.81	55
EDC	49.17		6.40	28
Nimnicht	48.32		5.38	37
Bank St.	47.46		5.42	34

$F = 4.53$ $p < .01$

*Non-significant range

Table 216

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 6 - Unnamed

Program	Mean	NSR*	S.D.	N
Gotkin	52.45		6.31	20
Tucson	51.79		6.78	29
Comp	51.67		5.92	55
EDC	50.11		5.38	28
PE	50.09		5.45	33
BE	49.91		5.80	31
Nimnicht	49.59		6.59	37
Bushell	49.16		5.94	22
Bank St.	48.84		6.07	34

$F = 1.31$

*Non-significant range

Table 217

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 7 - Classification

Program	Mean	NSR*	S.D.	N
PE	51.50		5.79	33
BE	51.33		4.85	31
Tucson	50.97		5.83	29
Bank St.	50.81		5.16	34
Nimnicht	50.10		4.41	37
Comp	49.93		6.69	55
Gotkin	49.78		7.09	20
EDC	49.11		5.71	28
Bushell	47.61		5.44	22

F = 1.20

*Non-significant range

Table 218

Multiple Range Test - Taxonomy of Cognitive Behavior

Factor 8 - Information Giving and Receiving

Program	Mean	NSR*	S.D.	N
EDC	50.94		4.00	28
Tucson	50.82		5.53	29
Bushell	50.51		6.21	22
Nimnicht	50.49		5.31	37
Comp	49.50		6.32	55
PE	49.44		5.54	33
Bank St.	48.65		5.43	34
Gotkin	48.25		4.46	20
BE	48.09		5.03	31

F = 1.17

*Non-significant range

Table 219

Multiple Range Test - Global Ratings and Classroom Descriptions

Factor 1 - Informal vs Formal Classroom Organization

Program	Mean	NSR*	S.D.	N
Nimnicht	54.39		3.20	37
Tucson	52.78		3.92	29
EDC	52.74		5.93	28
Gotkin	52.12		3.33	20
Bank St.	52.03		4.50	34
Bushell	49.31		3.26	22
PE	48.51		3.78	33
BE	46.47		2.07	31
Comp	44.69		4.79	55

$F = 25.41$ $p < .01$

*Nonsignificant range

Table 220

Multiple Range Test - Global Ratings and Classroom Descriptions

Factor 2 - Climate

Program	Mean	NSR*	S.D.	N
BE	55.04		5.50	31
Bank St.	50.08		4.60	34
Comp	50.04		6.11	55
PE	49.85		5.97	33
Bushell	49.82		3.68	22
EDC	49.15		7.22	28
Nimnicht	48.65		7.28	37
Tucson	48.55		5.82	29
Gotkin	45.96		5.83	20

$F = 4.43$ $p < .01$

*Nonsignificant range

in relation to FLACCS Strong Control and Pupil Negative Affect.

Factor 3 - Structured Learning Without the Teacher vs with the Teacher - The Tucson and Nimnicht programs were set off at the upper end of the factor, Bushell and BE at the lower end, and PE and Comparison classrooms were less extreme (Table 186). These results show considerable parallel with FLACCS 6, Work Without Teacher, and the same interpretations seem appropriate.

Factor 4 - Percent Nonwhite - Bushell, PE, and Gotkin were set off at the top end of the factor, indicating that these programs serve higher proportions of nonwhite pupils, and have higher proportions of nonwhite adults in their classrooms (Table 187).

Factor 5 - Time vs Space - This factor does not relate to program rationale, but does reflect the conditions under which the programs are implemented, and probably reflects regional differences as well. The BE and PE programs are set off at the upper end of the factor as having more time or less space, and Nimnicht as having the least time or the most space (Table 188).

Factor 6 - Unstructured vs Structured Time - This factor reflects the observers' pooled perception of the amount of time the typical pupil spent in structured activity during the day. It is somewhat related to the major dimension of teacher structure vs pupil freedom which has been mentioned before. Tucson, Nimnicht, and EDC were set off at the upper end of the factor, with BE set off at the lower end (Table 189). The placement of the Nimnicht, EDC, and BE programs all seem reasonable in terms of their rationales, but the placement of the Tucson program is perplexing.

Table 221

Multiple Range Test - Global Ratings and Classroom Descriptions

Factor 3 - Structured Learning Without the Teacher vs with the Teacher

Program	Mean	NSR*	S.D.	N
Tucson	54.42		5.85	29
Nimnicht	53.53		6.79	37
EDC	52.37		8.02	28
Bank St.	51.74		8.70	34
Gotkin	51.03		4.84	20
Comp	49.20		8.22	55
PE	49.06		6.69	33
Bushell	45.39		8.07	22
BE	43.51		7.86	31

F = 7.06 $p < .01$

*Nonsignificant range

Table 222

Multiple Range Test - Global Ratings and Classroom Descriptions

Factor 4 - Percent Nonwhite

Program	Mean	NSR*	S.D.	N
Bushell	54.14		6.28	22
PE	53.83		4.79	33
Gotkin	53.81		3.41	20
BE	49.46		3.18	31
Comp	49.31		7.19	55
Bank St.	48.71		7.51	34
EDC	48.24		7.32	31
Nimnicht	47.57		4.40	37
Tucson	47.33		5.63	29

F = 6.28 $p < .01$

Table 223

Multiple Range Test - Global Ratings and Classroom Descriptions

Factor 5 - Time vs Space

Program	Mean	NSR*	S.D.	N
BE	55.20		4.04	31
PE	53.65		5.59	33
Bank St.	51.53		7.06	34
Comp	49.82		8.27	55
Tucson	48.91		6.77	29
EDC	48.80		8.39	28
Bushell	48.60		8.63	22
Gotkin	47.29		4.51	20
Nimnicht	45.90		7.06	37

F = 5.71 $p < .01$

*Nonsignificant range

Table 224

Multiple Range Test - Global Ratings and Classroom Descriptions

Factor 6 - Unstructured vs Structured Time

Program	Mean	NSR*	S.D.	N
Tucson	55.49		6.42	29
Nimnicht	54.96		7.19	37
EDC	53.98		9.23	28
Gotkin	49.85		9.00	20
Bank St.	49.75		8.92	34
Bushell	47.76		6.98	22
Comp	47.60		6.93	55
PE	47.30		6.81	33
BE	44.54		5.93	31

F = 8.56 $p < .01$

*Nonsignificant range